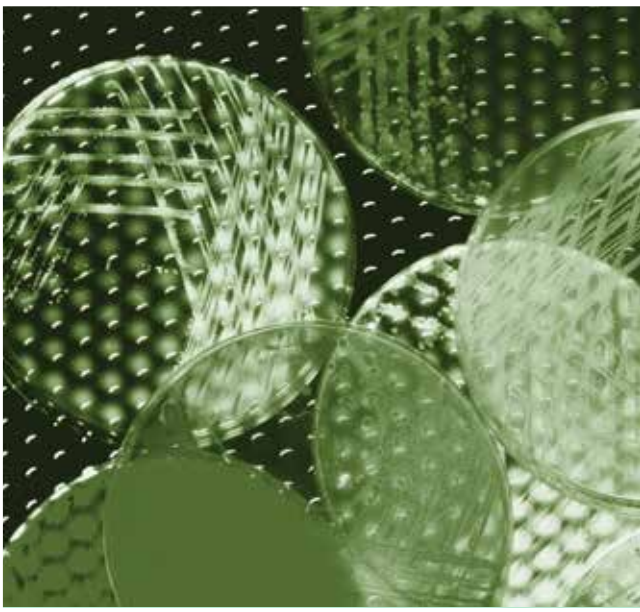
Barnsley Hospital NHS Foundation Trust
The Rotherham NHS Foundation Trust

Antimicrobial Policy for Children

age 1 month to 16 years

(Age less than 1 month, see Policy for Neonates)



Do not use antimicrobials unless absolutely essential

2013 15

Your health, your life, your choice, our passion

Contents
Antimicrobial Treatment Guidelines

Contents continued
Antimicrobial Prophylaxis

Abbreviations

BD	Every 12 hours
FBC	Full Blood Count
CCDC	Consultant in Community Diseases Control
CMV	Cytomegalovirus
CRP	C-Reactive Protein
CSF	Cerebrospinal Fluid
CSU	Catheter Specimen Urine
CXR	Chest X-Ray
DMSO	Dimethyl Sulphoxide
ELISA	Enzyme Linked Immunoassay
ESBL	Extended Spectrum Beta Lactamase
ET	Endotracheal
GRE	Glycopeptide Resistant Enterococci
GUM	Genito-Urinary Medicine
HPA	Health Protection Agency
HVS	High Vaginal Swabs
IF	Immunofluorescence
IgG	Immunoglobulin G
i/v	intravenous
kg	Kilogram
LFT	Liver Function Tests
LP	Lumber Puncture
MCUG	Micturating Cystourethrogram
mg	Milligram
mL	Millilitre
MRSA	Meticillin Resistant Staphylococcus Aureous
NPA	Nasopharyngeal Aspirate
OD	Once Daily
PICC	Peripherally Inserted Catheter
PCR	Polymerase Chain Reaction
PROM	Premature Rupture of Membranes
QDS	Every 6 hours
RDS	Respiratory Distress Syndrome
ROM	Rupture of Membranes
RSV	Respiratory Synctial Virus
SBR	Serum Bilirubin
SPA	Suprapubic Aspirate
SROM	Spontaneous Rupture Of Membranes
TDS	Every 8 hours
TORCH	***T****oxoplasma gondi,* ***R****ubella,* ***C****MV,* ***H****erpes simplex*
UAC	Umbilical Artery Catheter
UEs	Urea and Electrolytes
UTI	Urinary Tract Infection
UVC	Umbilical Venous Catheter
VZIg	Varicella Zoster Immunoglobulin
VIP	Venous Inflammatory Phlebitis score
WCC	White Cell Count

Antimicrobial Policy

Introduction

The aim of these guidelines is to optimise antimicrobial prescribing within both Barnsley Hospital NHS Foundation Trust and The Rotherham NHS Foundation Trust. Antimicrobials are over-prescribed in many health institutions and both these hospitals are not exempt. These guidelines would not only attempt to provide the best quality of care to manage patients with infections but also to reduce microbial resistance, healthcare associated infections and overall cost. The prudent use of antimicrobials in order to minimise the emergence of resistance has also been emphasised by the House of Lords and Department of Health (1998).[1]

The Chief Medical Officer in his report "Winning Ways" (December 2003) [2] has set out a clear direction on the actions required to reduce the level of healthcare associated infections and to curb the proliferation of antimicrobial-resistant organisms. Furthermore, antimicrobial usage has also been addressed in some of the domains of the Saving Lives toolkit[3] and more recently the Infection Control Code of Practice (September 2006)[4] has set standards for appropriate antimicrobial prescribing.

ANTIMICROBIAL RESISTANCE (The Path of Least Resistance)

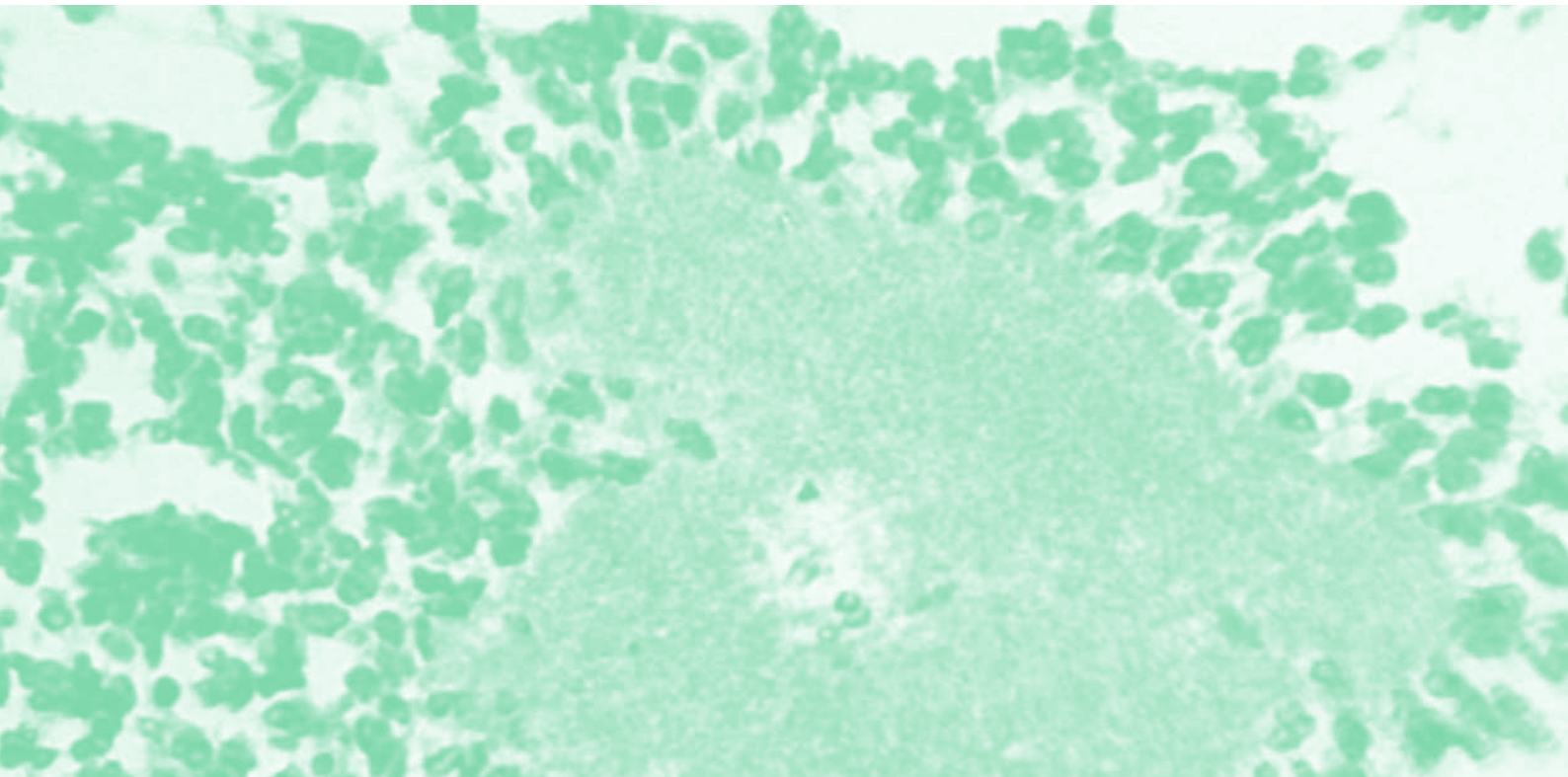
There is a growing national and international concern about the increasing resistance of micro-organisms to antimicrobial agents (House of Lords Select Committee on Science and Technology, Standing Medical Advisory Committee 1998).[5] This resistance is an inevitable consequence of antimicrobial use by Darwinian selection pressure. Resistance makes infections more difficult, and often more expensive to treat and may increase complications and length of hospital stay. The Chief Medical Officer has highlighted the importance of prudent use of antimicrobials, i.e. appropriate choice, dose and duration of antimicrobial therapy in his report "Winning Ways" (December 2003).[2]

In general, the more broad-spectrum antimicrobials are more likely to be associated with the emergence of resistance, furthermore some of the less broad-spectrum antimicrobials such as ciprofloxacin can select for emergence of MRSA.

ANTIMICROBIAL ASSOCIATED DIARRHOEA

Anitmicrobial usage particularly the more broad-spectrum ones may lead to diarrhoea and Clostridium difficile colitis.

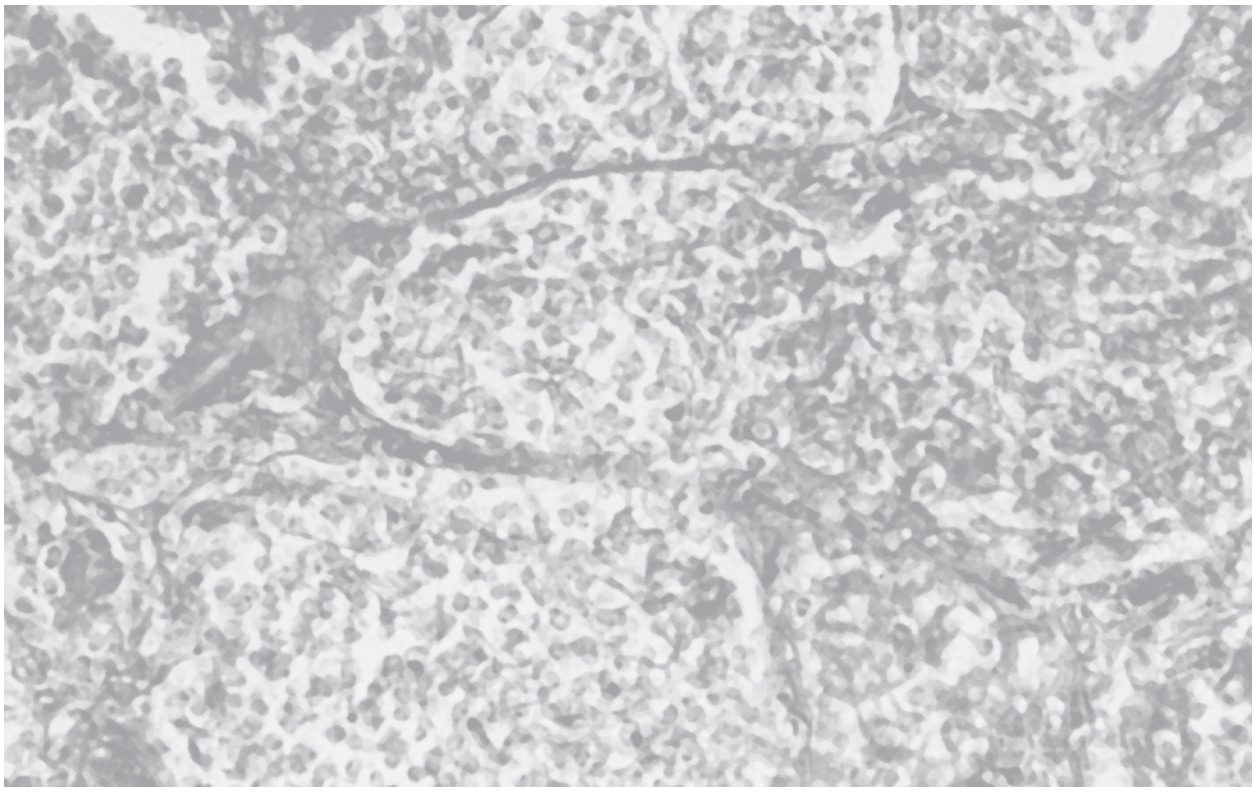
The aim of both hospitals is therefore not to use the more broad-spectrum antimicrobials.



PRINCIPLES OF ANTIMICROBIAL PRESCRIBING

Before prescribing antimicrobials, consider ten fundamental questions:

1. **Is the patient infected with a bacterial agent?**
2. **Are empirical antimicrobials necessary?**
3. **Have you checked antimicrobial allergies and their nature?**
4. **How can we make a microbiological diagnosis? Have the relevant specimens been obtained? (See user guide for more details).**
5. **Have you checked for any previous microbiology results?**
6. **Check for history of MRSA / ESBL / other resistant organisms and Clostridium difficile diarrhoea**
7. **What is the most appropriate antimicrobial therapy and how should it be given?**
8. **How can we monitor therapy?**
9. **What is the duration of antimicrobial therapy?**
10. **Are there any infection control / reporting issues?**



ESSENTIAL FACTS

- Encourage oral antimicrobials whenever possible
- Use IV antimicrobials only in serious infections or when patients are unable to take oral medication.
- After 24-48 hrs of IV therapy review the patient and consider switching to oral medication.
- Generally a total of 5 days of antimicrobials therapy should suffice for uncomplicated infections.
- Review antibiotics and clinical progress in the light of current microbiology results.
- Once the aetiological agent is identified, switch the broad spectrum therapy to a targeted narrow spectrum therapy.

Advice can always be obtained from the Department of Medical Microbiology. There is a 24 hour service, both technical and clinical, available for the investigation, treatment, and prevention of infections. Pharmacists may be contacted for dosage, therapeutic drug monitoring and medicines information.

ADHERENCE TO THE POLICY

This will be achieved by monitoring prescribing on a daily basis and as a rolling programme of audits by the directorates and the microbiology department, as recommended by Saving Lives.[6]

DRUG CHART

- Check for genuine allergy
- Check for MRSA status, ESBL producing and other resistant organisms and history of C.difficile diarrhoea
- Document INDICATION for therapy in the 'Additional instruction' section.
- Clearly document DOSE, ROUTE and DURATION of therapy

RESTRICTED ANTIMICROBIAL AGENTS

The following drugs are restricted, unless recommended by the Policy, because of toxicity, excessive cost and/or specific and limited indications for use. However these are available in the pharmacy on a named patient basis after discussion with a Consultant Microbiologist.

A Micro Approval Code may be required.

Antimicrobials restricted for use unless recommended in the Policy

Antimicrobials	Route
Amikacin	iv
Amphotericin	iv
Aztreonam	iv
Caspofungin	iv
Linezolid	oral iv
Meropenem	iv
Fusidic acid suspension Sodium fusidate tablets	oral

SBAR Reporting Infection

Attention all team members

For good communication about patients between all health professionals, use the SBAR tool before calling:

- **Assess the patient**
- **Know the admitting diagnosis**
- **Read the most recent progress notes and assessment from the prior shifts**
- **Have appropriate documents available eg Nursing and Medical Records, PAR (Patient at risk), Charts, Allergies, IV fluids, Resuscitation status**

S situation

- **State your name and unit/ward**
- **I am calling about patient's name and age**
- **The reason I am calling is...**

B ackground

- **State the admission diagnosis/working diagnosis and date of admission**
- **Relevant medical history including family history; underlying condition/ co morbidities**
- **A brief summary of treatment to date; current antimicrobial therapy and duration; recent antimicrobial use (within the last month if possible)**
- **History of MRSA/ ESBL/ other resistant organisms/ C.difficile diarrhoea**
- **Previous microbiology results**
- **Infective markers**

A ssessment

- **State**
  - **Allergies**
  - **Renal function**
  - **Hepatic function**

R ecommendation

- **I would like (state what you would like to see done)**
- **Determine timescale**
- **Is there anything else I should do?**
- **Record name and phone or bleep number of contact**
- **Patient concerns, expectations and wishes**

Don't forget to document the call!

RESPIRATORY TRACT INFECTIONS - Community acquired infections [13]

IMPORTANT before prescribing antimicrobials	
• **History of MRSA** – Contact Microbiologist • Check for microbiology results	**Take appropriate samples** • Cough swabs or sputum required in children with severe/ deteriorating illness • Blood culture in severe pneumonia

ASSESSMENT OF SEVERITY

	Mild to moderate	Severe
Infants	Temperature <38.50°C Respiratory rate < 50 breaths/minute Mild recession Taking full feeds	Temperature >38.5°C Respiratory rate >70 breaths/minute Moderate to severe difficulty in breathing Nasal flaring Cyanosis Intermittent apnoea Grunting respiration Signs of dehydration Tachycardia* Capillary refill time ≥ 2 seconds
Older children	Temperature <38.5°C Respiratory rate < 50 breaths/minute Mild breathlessness No vomiting	Temperature >38.5°C Respiratory rate >50 breaths/min Severe difficulty in breathing Nasal flaring Cyanosis Grunting respiration Signs of dehydration Tachycardia* Capillary refill time ≥ 2 seconds

*Values to define tachycardia vary with age and with temperature.

RESPIRATORY TRACT INFECTIONS - Community acquired infections [13]

IMPORTANT before prescribing antimicrobials

- **History of MRSA** – Contact Microbiologist
- Check for microbiology results

Take appropriate samples

- Cough swabs or sputum required in children with severe/ deteriorating illness
- Blood culture in severe pneumonia

INFECTION	USUAL ORGANISMS	ANTIMICROBIALS	COMMENTS
Pneumonia Uncomplicated and not severe	*Streptococcus pneumoniae* *Mycoplasma pneumoniae* *Haemophilus influenzae* *Chlamydia sp.* Viral	**Amoxicillin oral for 7 days** Add if no response or Mycoplasma or Chlamydia suspected **Clarithromycin oral** If pneumonia associated with influenza **Co-amoxiclav oral** Consider intravenous therapy if oral not tolerated and switch to oral as soon as evidence of improvement	Review empirical treatment in the light of microbiology results Consider acute and convalescent serology for atypical infections including mycoplasma GPAT P Penicillin allergy: • From 1 to 6 months **Clarithromycin oral for 7 days** • Over 6 months **Azithromycin oral for 3 days**

Amoxicillin oral

Age	*Dose*
1 month -1 year	125 mg tds
1 - 5 years	250 mg tds
5 - 18 years	500 mg tds

Amoxicillin i/v

Age	*Dose*
1 month - 18 years	50 mg/kg 4 - every 6 hours (max. 2 g every 4 hours)

Azithromycin oral

10mg/kg (max 500 mg) od

or

Body weight	*Dose*
15-25 kg	200 mg od
26-35 kg	300 mg od
36-45 kg	400 mg od
Over 45 kg	500 mg od

Clarithromycin oral

Age 1 month - 12 years	
Body weight	*Dose*
Less than 8 kg	7.5 mg/kg bd
8-11 kg	62.5 mg bd
12-19 kg	125 mg bd
20-29 kg	187.5 mg bd
30-40 kg	250 mg bd

Age	*Dose*
12-18 years	500 mg bd

Clarithromyicin i/v

Age	*Dose*
1 month - 12 years	7.5 mg/kg bd
12-18 years	500 mg bd

Co-amoxiclav oral

Age	*Dose*
1 month - 1 year	125/31susp 0.5 mL/ kg tds
1 - 6 years	250/62 susp 5 mL tds
6 - 12 years	250/62 susp 10 mL tds
12 - 18 years	500/125 tablets 1 tablet tds

Co-amoxiclav i/v

Age	*Dose*
1 month - 3 months	30 mg/kg every 12 hours
3 months - 18 years	30 mg/kg (max 1.2g) every 8 hours

RESPIRATORY TRACT INFECTIONS - Community acquired infections [13]

IMPORTANT Before prescribing antimicrobials

- **History of MRSA or *Clostridium difficile*** – contact Microbiologist
- Check for previous microbiology results

Take appropriate samples
- Cough swabs
- Sputum if possible
- Blood culture in severe pneumonia

INFECTION	USUAL ORGANISMS	ANTIMICROBIALS	COMMENTS
Severe or complicated Pneumonia See severity assessment	As for uncomplicated pneumonia plus Staphylococcus aureus Group A streptococococci	**Cefuroxime i/v** plus **Clarithromycin i/v** Review the need for Clarithromycin after 48 hours	Send blood cultures and sputum Send viral and atypical serology P Penicillin allergy *Life threatening:* discuss with Microbiologist If inadequate response discuss with Microbiologist Change to oral antibiotics depending on the microbiology results & satisfactory clinical response **Co-amoxiclav oral** with or without clarithromycin oral or P If penicillin allergy • 1 month to 6 months **Clarithromycin oral for 7 days** • Over 6 months **Azithromycin oral for 3 days** Consider longer course if severe infection

Azithromycin oral
10mg/kg (max 500 mg) od

or

Body weight	*Dose*
15-25 kg	200 mg od
26-35 kg	300 mg od
36-45 kg	400 mg od
Over 45 kg	500 mg od

Cefuroxime i/v

Age	*Dose*
1 month - 18 years	20 mg/kg (max 750 mg) every 8 hours, increase to 50-60 mg/kg (max 1.5 g) every 6-8 hours in severe infections

Clarithromycin i/v

Age	*Dose*
1 month - 12 years	7.5 mg/kg bd
12-18 years	500 mg bd

Clarithromycin oral

Age 1 month - 12 years	
Body weight	*Dose*
Less than 8 kg	7.5 mg/kg bd
8-11 kg	62.5 mg bd
12-19 kg	125 mg bd
20-29 kg	187.5 mg bd
30-40 kg	250 mg bd

Age	*Dose*
12-18 years	500 mg bd

Co-amoxiclav oral

Age	*Dose*
1 month-year	125/31susp 0.5 mL/ kg tds
1 - 6 years	250/62 susp 5 mL tds
6 - 12 years	250/62 susp 10 mL tds
12 - 18 years	500/125 tablets 1 tablet tds

RESPIRATORY TRACT INFECTIONS - Community acquired infections [13]

IMPORTANT Before prescribing antimicrobials

- **History of MRSA or *Clostridium difficile*** – contact Microbiologist
- Check for previous microbiology results

Take appropriate samples
- Cough swabs
- Sputum if possible
- Blood culture in severe pneumonia

INFECTION	USUAL ORGANISMS	ANTIMICROBIALS	COMMENTS
Primary Atypical Pneumonia	Mycoplasma pneumoniae Chlamydia pneumoniae	• 1 month to 6 months **Clarithromycin oral for 7 -14 days** • Over 6 months **Azithromycin oral for 3 days**	Take appropriate samples, including samples for serology In case of complications or no response contact Microbiologist Seek advice from Infection Control Team
Post influenza suspected bacterial pneumonia	Staphylococcus aureus Streptococcus pneumoniae Haemophilus influenzae Group A Streptococci	**If severe infection** **Cefuroxime i/v** **If not severe** • Less than 12 years **Co-amoxiclav oral for 7 days** • Over 12 years **Doxycycline oral for 7 days**	P Penicillin allergy: **Severe infection** Life threatening allergy Discuss with microbiologist **If not severe** • 1 month to 6 months **Clarithromycin oral for 7 days** • Over 6 months **Azithromycin oral for 3 days** Review empirical treatment in the light of microbiology results

Azithromycin oral
10mg/kg (max 500 mg) od

or

Body weight	*Dose*
15-25 kg	200 mg od
26-35 kg	300 mg od
36-45 kg	400 mg od
Over 45 kg	500 mg od

Cefuroxime i/v

Age	*Dose*
1 month - 18 years	20 mg/kg (max 750 mg) every 8 hours, increase to 50-60 mg/kg (max 1.5 g) every 6-8 hours in severe infections

Clarithromycin i/v

Age	*Dose*
1 month - 12 years	7.5 mg/kg bd
12-18 years	500 mg bd

Clarithromycin oral

Age 1 month - 12 years	
Body weight	*Dose*
under 8 kg	7.5mg/kg bd
8-11 kg	62.5 mg bd
12-19 kg	125 mg bd
20-29 kg	187.5 mg bd
30-40 kg	250 mg bd

Age	*Dose*
12-18 years	500 mg bd

Co-amoxiclav i/v

Age	*Dose*
1 month - 3 months	30 mg/kg every 12 hours
3 months - 18 years	30 mg/kg (max 1.2g) every 8 hours

Co-amoxiclav oral

Age	*Dose*
1 month - 1 year	125/31susp 0.5 mL/ kg tds
1 - 6 years	250/62 susp 5 mL tds
6 - 12 years	250/62 susp 10 mL tds
12 - 18 years	500/125 tablets 1 tablet tds

Doxycycline oral

Age	*Dose*
12-18 years	200 mg first dose then 100 mg od

RESPIRATORY TRACT INFECTIONS - Community acquired infections [13]

INFECTION	USUAL ORGANISMS	ANTIMICROBIALS	COMMENTS
Pneumonia	Confirmed Streptococcus pneumoniae	**Benzylpenicillin i/v** or **Amoxicillin oral** Total duration 7 days	P Penicillin allergy: **Clarithromycin i/v** Changing when tolerating oral to • 1 month to 6 months **Clarithromycin oral** • Over 6 months **Azithromycin oral** Total duration 7 days
	Confirmed Staphylococcus aureus	**Flucloxacillin i/v** In complicated cases consider adding **Clindamycin i/v** Total duration 2-3 weeks	Consider changing to **Flucloxacillin oral** P Penicillin allergy: **Clarithromycin i/v** Changing when tolerating oral to • 1 month to 6 months **Clarithromycin oral** • Over 6 months **Azithromycin oral** Discuss alternative choice of antibiotics with microbiologist
	Confirmed MRSA	**Teicoplanin i/v** plus **Rifampicin oral** Total duration 2-3 weeks	**Rifampicin** • NEVER USE ON ITS OWN • Seek Microbiologists advice if oral not possible • Monitor LFTs • Reduce dose in liver impairment
'Whooping cough'	*Pertussis bordella*	• 1 month to 6 months **Clarithromycin oral for 10 days** • Over 6 months **Azithromycin oral for 5 days**	Take pernasal swabs FBC and serology for pertussis Notify Public Health and Infection Control Team **Prophylaxis may be required for close family (advice from Public Health)**

Amoxicillin oral

Age	*Dose*
1 month - 1 year	125 mg tds
1-5 years	250 mg tds
5-18 years	500 mg tds

Azithromycin oral

10mg/kg (max 500 mg) od

or

Body weight	*Dose*
15-25 kg	200 mg od
26-35 kg	300 mg od
36-45 kg	400 mg od
Over 45 kg	500 mg od

Benzylpenicillin i/v

Age	*Dose*
1 month - 18 years	25 mg/ kg every 4-6 hours increasing to 50 mg/kg every 4 - 6 hours (max 2.4g every 4 hours in severe infection)

Clarithromycin i/v

Age	*Dose*
1 month - 12 years	7.5 mg/kg bd
12-18 years	500 mg bd

Clarithromycin oral

Age 1 month - 12 years	
Body weight	*Dose*
under 8 kg	7.5 mg/kg bd
8-11 kg	62.5 mg bd
12-19 kg	125 mg bd
20-29 kg	187.5 mg bd
30-40 kg	250 mg bd

Age	*Dose*
12-18 years	500 mg bd

Clindamycin i/v

Age	*Dose*
1 month - 12 years	3.75 – 6.25 mg/kg every 6 hours increasing to 10 mg/kg every 6 hours
12 - 18 years	150 - 675 mg every 6 hours increasing to 1.2 g every 6 hours

Co-amoxiclav i/v

Age	*Dose*
1 month - 3 months	30 mg/kg every 12 hours
3 months - 18 years	30 mg/kg (max 1.2 g) every 8 hours

Co-amoxiclav oral

Age	*Dose*
1 month - 1 year	125/31susp 0.5 mL/ kg tds
1 - 6 years	250/62 susp 5 mL tds
6 – 12 years	250/62 susp 10 mL tds
12 – 18 years	500/125 tablets 1 tablet tds

Flucloxacillin i/v

Age	*Dose*
1 month - 18 years	25 mg/kg (max 1g) every 6 hours

Flucloxacillin oral

Age	*Dose*
1 month - 2 years	125 mg qds
2 - 10 years	250 mg qds
10 – 18 years	500 mg qds

Rifampicin oral

Age	*Dose*
1 month - 18 years	10 mg/kg (max 600 mg) every 12 hours

Teicoplanin i/v

Age	*Dose*
1 month - 18 years	10 mg/kg (max 400 mg) every 12 hours for 3 doses than 6 mg/kg (max 400 mg) od

RESPIRATORY TRACT INFECTIONS - Hospital - acquired pneumonia

IMPORTANT Before prescribing antimicrobials

- **History of MRSA –** Contact Microbiologist
- Check for previous microbiology results

Take appropriate samples

- Cough swabs
- Sputum if possible
- Blood cultures

INFECTION	USUAL ORGANISMS	ANTIMICROBIALS	COMMENTS
Hospital Acquired Pneumonia	Wide range of organisms including MRSA *Pseudomonas spp.*	Seek advice from Consultant Microbiologist	Review in the light of cultures & sensitivities

INFECTION	USUAL ORGANISMS	ANTIMICROBIALS	COMMENTS
Aspiration Pneumonia	Wide range of organisms including anaerobes	If no previous use of antibiotics then **Co-amoxiclav i/v** plus **Metronidazole i/v**	Review in the light of cultures Change to **Co-amoxiclav oral** Total duration 5 days P Penicillin allergy: seek advice from Microbiologist

Co-amoxiclav i/v

Age	*Dose*
1 month - 3 months	30 mg/kg every 12 hours
3 months - 18 years	30 mg/kg (max 1.2 g) every 8 hours

Co-amoxiclav oral

Age	*Dose*
1 month - 1 year	125/31susp 0.5 mL/ kg tds
1 - 6 years	250/62 susp 5 mL tds
6 – 12 years	250/62 susp 10 mL tds
12 – 18 years	500/125 tablets 1 tablet tds

Metronidazole i/v

Age	*Dose*
1 month - 2 months	7.5 mg/kg every 12 hours
2 month - 18 years	7.5 mg/kg (max 500 mg) every 8 hours

RESPIRATORY TRACT INFECTIONS - Mycobacterial infections

IMPORTANT Before prescribing antimicrobials	
• **History of MRSA –** Contact Microbiologist • Check for previous microbiology results	**Take appropriate samples** • Cough swabs • Sputum if possible • Blood cultures

INFECTION	USUAL ORGANISMS	ANTIMICROBIALS	COMMENTS
Tuberculosis	*Mycobacterium tuberculosis* *Mycobacterium bovis* *Mycobacterium africanum*	Discuss with Microbiologist and Paediatrician with specialist interest in infectious diseases	Please refer to NICE guidance and TB policy. **Infection control risk** – Inform Infection Control Team **for appropriate isolation and infection control precautions** Notify Public Health Doctor
Atypical Mycobacterial Infection	*Mycobaterium avium intracellulare* *Mycobacterium kansasii* *Mycobacterium malmoense etc.*	Consult Microbiology for susceptibility details	Seek advice from Consultant Microbiologist and Paediatrician with specialist interest in infectious diseases No need for isolation or notification of infection
Cystic fibrosis		See Intranet	Refer to local cystic fibrosis guidelines and take advice from Paediatrician

URINARY TRACT INFECTION IN CHILDREN [15]

- NICE Guidance has been adopted and modified for local use. Please use the summary algorithm (page 18)
- Refer to NICE website to access the full documents for more information.

A. Urine Sample Collection and Handling and Interpretation

1 Septic infants – do 'triple tap', ie supra-pubic aspiration (1 attempt) as the first method of urine collection. Ultrasound guidance is routinely not available to us. Remember to specify SPA as collection method on laboratory request, it matters for interpretation.

2 For less ill children - clean catch sampling is next best method, try for 30 minutes; if this fails then:
Urine collection pad;nurse who collects the sample must specify on the laboratory request form the sample method.

3 All urine samples for suspected UTI should be ward dip tested for nitrites, blood and leukocytes; if nitrite and leukocyte positive – start treatment empirically;

4 In the laboratory urine 'microscopy' is initially done by flow cytometry; this is extremely sensitive to the extent that reported 'bacteriuria' has a very high false positive rate for UTIC.

5 Over 3 years of age – negative nitrites and leukocytes on dip is usually enough to exclude UTI, unless symptoms are very suggestive of UTI.

B. Treatment

THE TREATMENT SHOULD BE ACCORDING TO THE RISK OF SERIOUS ILLNESS:	
High risk of serious illness and/or children younger than 3 months with suspicion of UTI	Intravenous antibiotics **Cefotaxime i/v** or **Amoxicillin i/v plus Gentamicin**
Acute pyelonephritis / upper urinary tract infection	**Co-amoxiclav oral** or **Cephalexin oral** (if oral antibiotics cannot be used, consider i/v antibiotics) Duration 10 days
Cystitis / lower urinary tract infection	**Co-amoxiclav oral** or **Cephalexin oral** Duration 3 days only Review if still unwell after 24 - 48 hours

Prophylaxis

No routine prophylaxis after first UTI, except those children under 6 month with 'atypical' or 'recurrent UTI', who, by NICE guidance, will have MCUG.
Trimethoprim is first choice prophylaxis.

C. Imaging

As per NICE algorithm.
Note stratification by age (under 6 months, 6 months-3 year and over 3 years) AND the categories 'atypical' and 'recurrent' UTI.

Keywords:
UTI, Urinary tract infection, NICE, 'recurrent' UTI.

ASSESSMENT, DIAGNOSIS AND INITIAL MANAGEMENT OF UTI IN CHILDREN

Urine sample
- Clean catch (recommended)
- Urine Collection Pad (if not Able to get clean catch)

History & examination
Signs & symptoms suggestive of UTIC
- preverbal: fever, vomiting, lethargy, irritability, prolonged jaundice, FTT
- verbal: abdominal/loin pain, fever, dysuria, wetting etc

'Septic infant' – high risk of serious illness
- **resuscitate as necessary**
  - suprapubic aspirate (SPA), catheter or clean catch as part of 'septic screen' (but start antibiotics if urine sample delayed)
- **Initial antibiotics as IV Cefotaxime**

- **Ward dipstick urine**
- **And send for lab culture for under 3 years of age**

	Leucocytes	
	+ve	-ve
Nitrites		
+ve	TREAT	TREAT
-ve	?TREAT*	X

*only if clinically UTI
X no need to send lab sample less than3 years

Check for risk factors:
Poor urine stream
Previous UTI
Antenatal scan renal abnormality
Family history of VUR / renal disease
Constipation
Palpable bladder
Abdominal mass
Evidence of spinal lesion
Poor growth
Hypertension

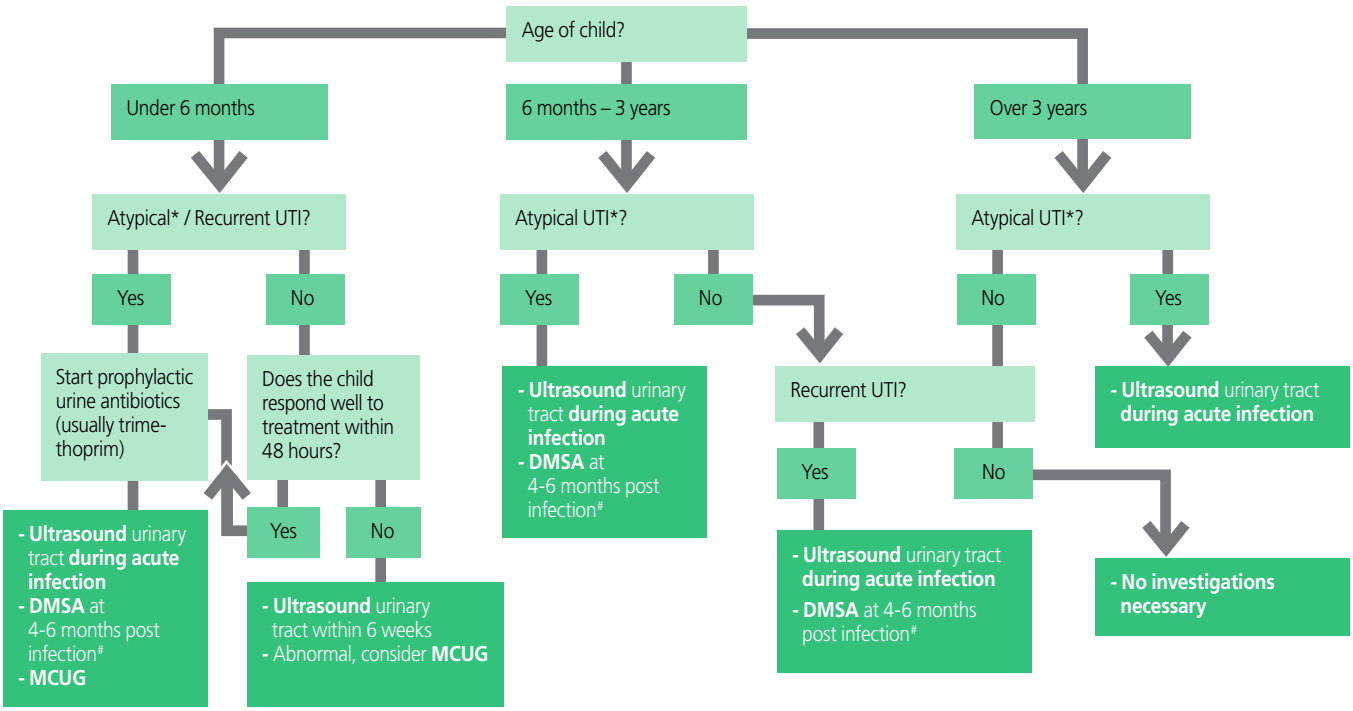
Febrile = pyelonephritis
- Co-amoxiclav oral or cefotaxime I/V
- 10 days treatment
- Start urine prophylaxis (usually trimethoprim) for age under 6months with **atypical** or **recurrent UTI**

Afebrile=lower UTI
- Co-amoxiclav oral initially
- 3 days treatment

Home if well, with **parental advice to bring child back if still unwell after 24-28 hours**

Advice to parents/patient:
- Prevention (avoid constipation, drink plenty)
- Importance of treatment compliance
- Recognize symptoms suggestive of recurrence of UTI and act
- Explain imaging plan (see over)

IMAGING SCHEDULE AFTER UTI IN CHILDREN



Atypical UTI – seriously ill / septic, poor urine stream, kidney / bladder mass, raised s. creatinine, failure to respond to treatment within 48 hours, Non-E.coli infection (this includes 'coliforms')
Recurrent UTI - > 2 Pyelonephritis, pyelonephritis + > 1 lower UTI, > 3 lower UTIs
* If infant / child with non-E.coli UTI responds well to antibiotics and has no other features of atypical infection, USS can be done non-urgent (within 6 weeks)
# If child has subsequent UTI whilst awaiting DMSA, timing of DMSA should be reviewed and consideration given to doing it sooner
MCUG, though not done routinely, may be considered in children with calyceal/ureteric dilatation, poor urine flow, non-E.coli UTI (esp. 6 months – 3 years), FHx of VUR

SEPTICAEMIA [16]

- It is important to establish the primary source of septicaemia in order to shed light on the most probable organisms and the underlying pathology.
- Blood culture should be taken BEFORE commencing antimicrobial therapy.
- **Start antibiotics immediately. Prescribe in STAT section of drug chart.**

IMPORTANT Before prescribing antimicrobials	
• **History of MRSA or *C.difficile*** – contact Microbiologist • Check for previous microbiology results	**Take appropriate samples** (If possible, clinical condition permitting) • Blood cultures • Urine • Sputum

IMPORTANT THERAPEUTIC MONITORING	
Gentamicin and vancomycin • Renal impairment- discuss with microbiologist • Monitor blood levels • Monitor renal function three times a week • Review treatment every 3 days	Inform patient or carer of potential side effects (hearing balance and renal impairment) Discuss with microbiologist before continuing for longer than 7 days

COMMUNITY - Acquired Septicaemia

INFECTION	USUAL ORGANISMS	ANTIMICROBIALS	COMMENTS
Sepsis **Source unknown**	Streptococci sp Pneumococci Staphylococcus aureus Gram negative organisms Meningococci	**Cefotaxime i/v** When clinical condition stable, consider changing to **Ceftriaxone i/v**	Take appropriate samples P Penicillin allergy: Mild Give Cefotaxime Anaphylaxis: Teicoplanin plus Gentamicin Seek advice from Microbiologist Review treatment in the light of cultures and clinical response UTI is the commonest cause Duration 5-7 days If meningitis suspected see meningitis guidelines (page 18)
Intravascular catheter associated infection	Coagulase negative staphylococci Staphylococcus aureus	**Teicoplanin i/v** plus **Gentamicin i/v**	Remove the i/v line Take blood cultures from peripheral line Send catheter tip to the microbiology department

HOSPITAL - Acquired Septicaemia

INFECTION	USUAL ORGANISMS	ANTIMICROBIALS	COMMENTS
Source unknown	Wide range of hospital organisms		Contact Microbiologist

Cefotaxime i/v

Age	*Dose*
1 month - 18 years	50 mg/kg every 6 hours Max 12 g daily

Ceftriaxone i/v

Infusion over 30 minutes

Age	*Dose*
1 month - 12 years	Under 50 kg 80mg/ kg od Over 50 kg 2-4 g daily
12 - 18 years	2 -4 g daily

Gentamicin i/v

Age	*Dose*
1 month - 12 years	2.5 mg/kg every 8 hours
12 – 18 years	2mg/kg every 8 hours

Teicoplanin i/v

Age	*Dose*
1 month - 18 years	10 mg/kg (max 400 mg) every 12 hours for 3 doses then 6 mg/kg (max 400 mg) od

ENDOCARDITIS - Empirical (organism not known) [17]

- Always discuss treatment with Consultant Paediatric Cardiologist at Leeds General Infirmary and local Microbiologist.
- Discuss need for immediate antibiotics with paediatric cardiologist, particularly if child appears septic.

IMPORTANT Before prescribing antimicrobials

- **History of MRSA –** Contact Microbiologist
- Check for previous microbiology results
- Treatment duration depends on the organism and patient factors.

Take appropriate samples

THREE sets of blood cultures from different sites and at different times PRIOR to antimicrobial therapy if clinical condition allows.

IMPORTANT Therapeutic

Gentamicin and vancomycin

- Renal impairment - discuss with microbiologist
- Monitor blood levels
- Monitor renal function three times a week
- Review treatment every 3 days

Inform patient or carer of potential side effects (hearing balance and renal impairment)

Discuss with microbiologist before continuing for longer than 2 weeks

INFECTION	USUAL ORGANISMS	ANTIMICROBIALS	COMMENTS
Acute presentation	Empirical	**Flucloxacillin i/v** plus **Gentamicin i/v** plus **Vancomycin i/v**	P Penicillin allergy: Contact Consultant Microbiologist
Subacute presentation	Empirical	**Benzylpenicillin i/v** plus **Gentamicin i/v**	Gentamicin levels: Pre dose (trough): <1mg/L 1 hour Post dose (peak): 3 – 5 mg/L (i.e. not the usual therapeutic levels).
P Penicillin allergy or **Intra-cardiac prosthesis** (Patches, conduits, pacing wires) or **Suspected MRSA**	Empirical	**Vancomycin i/v** plus **Rifampicin oral** plus **Gentamicin i/v**	Vancomycin levels: Only predose level required Pre dose (trough): 15 – 20 mg/L

Benzylpenicillin i/v

Age	*Dose*
1 month - 18 years	25 mg/kg every 4 hours increase if necessary to 50 mg/kg (max 2.4 g) every 4 hours

Flucloxacillin i/v

Age	*Dose*
1 month - 18 years	50 mg/kg (max 2 g) every 6 hours

Gentamicin i/v

Age	*Dose*
1 month - 18 years	2.5mg/kg every 12 hours

Rifampicin oral

Age	*Dose*
1 month - 12 years	10mg/kg (max 600mg) every 12 hours

Vancomycin i/v

15 mg/kg every 8 hours
Maximum 2 g in 24 hours

CENTRAL NERVOUS SYSTEM INFECTIONS - Bacterial Meningitis [18]

IMPORTANT Before prescribing antimicrobials

- **History of MRSA** – contact Microbiologist
- Check for previous microbiology results
- **Avoid ceftriaxone for the first 48 hours if child likely to require calcium containing infusion or admission to HDU or PICU**

Take appropriate samples

- Blood cultures
- CSF for PCR, microscopy, protein, glucose
- Plasma glucose (to compare CSF)
- Throat swabs (bacteriology plus virology)
- EDTA blood for PCR (meningococcal, pneumococcus, enterovirus, herpes)
- Stool for enteroviruses

INFECTION	USUAL ORGANISMS	ANTIMICROBIALS	COMMENTS
Bacterial meningitis	*Neisseria meningitidis* *Streptococcus pneumoniae* *Haemophillus influenzae type b*	Initially: *Age* / *Antimicrobial* Less than 3 months: **Cefotaxime i/v** plus **Amoxicillin i/v** Older than 3 months: **Ceftriaxone i/v** **Rationalise antimicrobials in the light of culture and sensitivities (See Page 24)**	**Medical emergency** Start antibiotics immediately, then inform CCDC for prophylaxis of close contacts in case of meningococcal infection Inform Hospital Infection Control Team **Remember to consider** dexamethasone i/v - ideally before or as soon as possible after the first dose of antibiotic P Penicillin allergy: discuss with Consultant Microbiologist If not treated with ceftriaxone, eradication of throat carriage of H influenzae and meningococcal may be necessary (see page 47) *Please advise patients and carers on avoiding risk in the future **Gentamicin levels: Pre dose (trough): < 2 mg/L 1 hour Post dose (peak): 5 – 10 mg/L
	All other organisms including *Mycobacterium tuberculosis*		Discuss with Consultant Microbiologist

Amoxicillin i/v

Age	*Dose*
1 month - 18 years	50 mg/kg every 4- 6 hours (max. 2 g every 4 hours)

Cefotaxime i/v

Age	*Dose*
1 month - 18 years	50 mg/kg every 6 hours (max 12 g daily)

Ceftriaxone i/v

Infusion over 30 minutes

Age	*Dose*
1 month - 12 years	Under 50 kg 80mg/ kg od Over 50 kg 2-4 g daily
12 - 18 years	2 -4 g daily

****Gentamicin i/v**

Age	*Dose*
1 month - 12 years	2.5 mg/kg every 8 hours
12 – 18 years	2mg/kg every 8 hours

CENTRAL NERVOUS SYSTEM INFECTIONS - Bacterial meningitis [18]

Rationalise antimicrobials as below:

	Duration of therapy	
	Age less than 3 months	**Age 3 months or older**
Confirmed disease Positive blood/CSF culture and/or blood CSF PCR	*Group B streptococcus* **Cefotaxime i/v** at least 14 days *L monocytogenes* **Amoxicillin i/v** at least 21 days plus **Gentamicin i/v** for at least 7 days Gram negative bacilli **Cefotaxime i/v** at least 21 days Meningococcal **Ceftriaxone i/v** Total 7 days	*H influenzae* **Ceftriaxone i/v** Total 7 days *S pneumoniae* **Ceftriaxone i/v** Total 14 days Meningococcal **Ceftriaxone i/v** Total 7 days total
Unconfirmed disease (with strong suspicion in the absence of microbiological confirmation) Failed lumbar puncture or Negative blood/CSF culture and/or blood / CSF PCR	**Cefotaxime i/v** for at least 14 days plus **Amoxicillin i/v** for at least 14 days	**Ceftriaxone i/v** for at least 10 days

Amoxicillin i/v

Age	*Dose*
1 month - 18 years	50 mg/kg every 4 - 6 hours (max 2 g every 4 hours)

Cefotaxime i/v

Age	*Dose*
1 month - 18 years	50 mg/kg every 6 hours (max 12 g daily)

Ceftriaxone i/v

Infusion over 30 minutes

Age	*Dose*
1 month - 12 years	Under 50 kg 80mg/ kg od Over 50 kg 2-4 g daily
12 - 18 years	2 -4 g daily

****Gentamicin i/v**

Age	*Dose*
1 month - 12 years	2.5 mg/kg every 8 hours
12 – 18 years	2mg/kg every 8 hours

CENTRAL NERVOUS SYSTEM INFECTIONS *continued* [9]

IMPORTANT Before prescribing antimicrobials

- **History of MRSA** – contact Microbiologist
- Check for previous microbiology results
- **Avoid ceftriaxone for the first 48 hours if child likely to require calcium containing infusion or admission to HDU or PICU**

Take appropriate samples

- Blood cultures
- CSF for PCR, microscopy, protein, glucose
- Plasma glucose (to compare CSF)
- Throat swabs (bacteriology plus virology)
- EDTA blood for PCR (meningococcal, pneumococcus, enterovirus, herpes)
- Stool for enteroviruses

INFECTION	USUAL ORGANISMS	ANTIMICROBIALS	COMMENTS
Viral meningitis	*Enteroviruses* Consider Herpes simplex virus if severe infection	Antiviral not available Stop antivirals if PCR negative	Take stool samples and throat swabs Seek advice from Consultant Microbiologist PCR will confirm presence of enteroviruses and other viruses
Encephalitis Suspected	Commonest agent Herpes simplex virus (HSV) Mycoplasma Other infective agents include: Varicella zoster (VZV) Cytomegalovirus (CMV) Toxoplasma and fungi	**Aciclovir i/v** Total duration 21 days If Herpes confirmed Add if Mycoplasma suspected **Clarithromycin i/v** Duration: if Mycoplasma confirmed 14 days	Discuss with Consultant Microbiologist PCR on the CSF will confirm HSV infection Blood for specific serology mycoplasma including G-PAT Review treatment in the light of microbiology results
Brain abscess	Depends on source of abscess	Start with **Cefotaxime i/v** plus **Metronidazole i/v**	Discuss treatment & management with Microbiologist and Paediatric Neurosurgeon Treatment modified according to the nature of organism & clinical manifestation

Aciclovir i/v

- Adjust dose in renal impairment
- Dose based on ideal weight for height
- Infuse over 60 minutes

Age	*Dose*
1 month to 3 months	20 mg/kg every 8 hours
3 months to 12 years	500 mg/m^2 every 8 hours
12 – 18 years	10 mg/kg every 8 hours

Cefotaxime i/v

Age	*Dose*
1 month - 18 years	50 mg/kg every 6 hours Max 12 g daily

Clarithromycin i/v

Age	*Dose*
1 month - 12 years	7.5 mg/kg every 12 hours
12-18 years	500 mg every 12 hours

Metronidazole i/v

Age	*Dose*
1 month - 2 months	7.5 mg/kg every 12 hours
2 month - 18 years	7.5 mg/kg (max 500 mg) every 8 hours

SKIN AND SOFT TISSUE INFECTIONS - Bacterial [7]

IMPORTANT Before prescribing antimicrobials

- **History of MRSA** – contact Microbiologist
- Check for previous microbiology results

Take appropriate samples

- Pus and aspirate when available
- Wound swabs
- Blood cultures

INFECTION	USUAL ORGANISMS	ANTIMICROBIALS	COMMENTS
Impetigo: MILD	*Staphylococcus aureus* *Group A Streptococci*	Local therapy may suffice **Hydrogen peroxide (Crystacide)** or **Polyfax ointment** Apply bd If systemic antibiotics required **Flucloxacillin oral**	Follow infection control procedures P Penicillin allergy • 1 month to 6 months **Clarithromycin oral** • Over 6 months **Azithromycin oral for 3 days** If i/v needed, **Clarithromycin i/v**
SEVERE		**Benzylpenicillin i/v** plus **Flucloxacillin i/v**	Consider oral only after satisfactory response **Amoxicillin oral** plus **Flucloxacillin oral** P Penicillin allergy **Clarithromycin i/v** Changing to oral after satisfactory response Total duration 5 –10 days, depending on response

Azithromycin oral

10 mg/kg (max 500 mg) od

or

Body weight	*Dose*
15-25 kg	200 mg od
26-35 kg	300 mg od
36-45 kg	400 mg od
Over 45 kg	500 mg od

Benzylpenicillin i/v

Age	*Dose*
1 month – 18 years	25 mg/kg every 6 hours Increasing to 50 mg/kg (max 2.4 g) every 4 hours

Clarithromycin oral

Age 1 month - 12 years	
Body weight	*Dose*
Less than 8 kg	7.5 mg/kg bd
8 – 11 kg	62.5 mg bd
12 – 19 kg	125 mg bd
20 – 29 kg	187.5 mg bd
30 - 40 kg	250 mg bd

Age	*Dose*
12-18 years	500 mg bd

Clarithromycin i/v

Age	*Dose*
1 month - 12 years	7.5 mg/kg every 12 hours
12-18 years	500 mg every 12 hours

Flucloxacillin i/v

Age	*Dose*
1 month - 18 years	25 mg/kg (max 1 g) every 6 hours Increasing to 50 mg/kg (max 2 g) every 6 hours

Flucloxacillin oral

Age	*Dose*
1 month - 2 years	125 mg qds
2 - 10 years	250 mg qds
10 – 18 years	500 mg qds

SKIN AND SOFT TISSUE INFECTIONS - Bacterial [7]

IMPORTANT Before prescribing antimicrobials

- **History of MRSA or C.difficile** – contact Microbiologist
- Check for previous microbiology results
- Treatment duration (iv plus oral) 5 days unless specified

Take appropriate samples

- Pus and aspirate when available
- Wound swabs
- Blood cultures

INFECTION	USUAL ORGANISMS	ANTIMICROBIALS	COMMENTS
Erysipelas	*Group A, C, G Streptococci*	**Benzylpenicillin i/v** or For less severe infection **Amoxicillin oral** Total duration 5 – 10 days, depending on severity	Consider oral Amoxicillin following adequate clinical response P Penicillin allergy • 1 month to 6 months **Clarithromycin oral for 7 days** • Over 6 months **Azithromycin oral for 3 days** If i/v needed **Clarithromycin i/v**

Amoxicillin oral

Body weight	*Dose*
1 month -1 year	125 mg tds
1 - 5 years	250 mg tds
5 - 18 years	500 mg tds

Azithromycin oral

10mg/kg (max 500 mg) od

or

Body weight	*Dose*
15-25 kg	200 mg od
26-35 kg	300 mg od
36-45 kg	400 mg od
Over 45 kg	500 mg od

Benzylpenicillin i/v

Age	*Dose*
1 month -18 years	25 mg/kg every 4-6 hours Increasing to 50 mg/kg every 4 hours (max 2.4g) every 4 hours

Clarithromycin i/v

Age	*Dose*
1 month - 12 years	7.5 mg/kg bd
12 – 18 years	500mg bd

Clarithromycin oral

Age 1 month - 12 years	
Body weight	*Dose*
less than 8 kg	7.5 mg/kg bd
8-11 kg	62.5 mg bd
12-19 kg	125 mg bd
20-29 kg	187.5 mg bd
30-40 kg	250 mg bd

Age	*Dose*
12-18 years	500 mg bd

SKIN AND SOFT TISSUE INFECTIONS - Bacterial [7]

IMPORTANT Before prescribing antimicrobials

- **History of MRSA or C.difficile** – contact Microbiologist
- Check for previous microbiology results
- Treatment duration (iv plus oral) 5 days unless specified

Take appropriate samples

- Pus and aspirate when available
- Wound swabs
- Blood cultures

INFECTION	USUAL ORGANISMS	ANTIMICROBIALS	COMMENTS
Cellulitis: MILD	*Staphylococcus aureus* *Group A, C, G Streptococci*	**Flucloxacillin oral** Duration 7 days	P Penicillin allergy • 1 month to 6 months **Clarithromycin oral for 7 days** • Over 6 months **Azithromycin oral for 3 days** If i/v needed, **Clarithromycin i/v**
SEVERE		**Benzylpenicillin i/v** plus **Flucloxacillin i/v** Duration Some patients may need longer than 7 days (eg for Group A Streptococci 10 days)	**High dose i/v antimicrobials are necessary initially** Consider oral only after satisfactory response **Amoxicillin oral** plus **Flucloxacillin oral** P Penicillin allergy: **Clarithromycin i/v**

Amoxicillin oral

Age	*Dose*
1 month - 1 year	125 mg tds
1 - 5 years	250 mg tds
5 – 18 years	500 mg tds

Azithromycin oral

10 mg/kg (max 500 mg) od

or

Body weight	*Dose*
15-25 kg	200 mg od
26-35 kg	300 mg od
36-45 kg	400 mg od
Over 45 kg	500 mg od

Benzylpenicillin i/v

Age	*Dose*
1 month -18 years	25 mg/kg every 4-6 hours Increasing to 50 mg/kg every 4 hours (max 2.4g) every 4 hours

Clarithromycin i/v

1 month - 12 years	7.5 mg/kg every 12 hours
12-18 years	500 mg every 12 hours

Clarithromycin oral

Age 1 month - 12 years	
Body weight	*Dose*
Less than 8 kg	7.5 mg/kg bd
8 – 11 kg	62.5 mg bd
12 – 19 kg	125 mg bd
20 – 29 kg	187.5 mg bd
30 - 40 kg	250 mg bd

Age	*Dose*
12-18 years	500 mg bd

Flucloxacillin i/v

Age	*Dose*
1 month - 18 years	25 mg/kg (max 1 g) every 6 hours Increasing to 50 mg/kg (max 2 g) every 6 hours

Flucloxacillin oral

Age	*Dose*
1 month - 2 years	125 mg qds
2 - 10 years	250 mg qds
10 – 18 years	500 mg qds

SKIN AND SOFT TISSUE INFECTIONS - Bacterial [7]

IMPORTANT Before prescribing antimicrobials

- **History of MRSA or C.difficile** – contact Microbiologist
- Check for previous microbiology results

Take appropriate samples

- Pus and aspirate when available
- Wound swabs
- Blood cultures

INFECTION	USUAL ORGANISMS	ANTIMICROBIALS	COMMENTS
Bites Animal and human Antibiotic prophylaxis advised for: puncture wound, bite involving hand, foot, face, joint, tendon, ligament; immunocompromised, diabetics, asplenic patients	Anaerobes *Streptococcus sp* *Pasteurella multocida* Human mouth flora including HACEK organisms	Prophylaxis and treatment: **Co-amoxiclav oral**	Surgical toilet most important Assess tetanus and rabies risk (Refer to Green Book) **P** Penicillin allergy **Clindamycin oral** plus **Ciprofloxacin oral** **Human bite** Assess HIV/hepatitis B & C risk Refer to Blood Borne Virus Policy for appropriate prophylaxis

Ciprofloxacin oral

Age	*Dose*
1 month -18 years	10 mg/kg bd Double dose in severe infections (max 750 mg bd)

Clindamycin oral

Age	*Dose*
1 month - 12 years	6 mg/kg (max 450 mg) qds
12 – 18 years	150 – 300 mg qds

Co-amoxiclav oral

Age	*Dose*
1 month -1 year	125/31susp 0.5 mL/ kg tds
1 - 6 years	250/62 susp 5 mL tds
6 - 12 years	250/62 susp 10 mL tds
12 - 18 years	500/125 mg tds

SKIN AND SOFT TISSUE INFECTIONS - Wound infections

IMPORTANT Before prescribing antimicrobials

- **History of MRSA** – contact Microbiologist
- Check for previous microbiology results

Take appropriate samples
- Pus and aspirate when available
- Wound swabs
- Blood cultures

INFECTION	USUAL ORGANISMS	ANTIMICROBIALS	COMMENTS
Surgical Site Infection Following Clean Surgery	*Staphylococcus aureus* *Streptococcus sp* MRSA	**Flucloxacillin i/v** or **Flucloxacillin oral** Total duration 5 days	Mild erythema or serous discharge may not require antimicrobials (Serous discharge is not an infection) In severe cases seek advice from Consultant Microbiologist P Penicillin allergy • 1 month to 6 months **Clarithromycin oral for 5 days** • Over 6 months **Azithromycin oral for 3 days** i/v needed, **Clarithromycin i/v** Discuss with microbiologist
Surgical Site Infection Following Contaminated Surgery	*Staphylococcus aureus* *MRSA* *Anaerobes* *Coliforms* *Not usually a pathogen, only colonisation*	Seek advice from Microbiologist	The mainstay of treatment is surgical intervention Not all isolates are significant

Azithromycin oral

10mg/kg (max 500 mg) od
or

Body weight	*Dose*
15 - 25 kg	200 mg od
26 - 35 kg	300 mg od
36 - 45 kg	400 mg od
Over 45 kg	500 mg od

Clarithromycin i/v

Age	*Dose*
1 month - 12 years	7.5 mg/kg bd
12 - 18 years	500 mg bd

Clarithromycin oral

Age 1 month - 12 years

Body weight	*Dose*
Less than 8 kg	7.5 mg/kg bd
8 - 11 kg	62.5 mg bd
12 - 19 kg	125 mg bd
20 - 29 kg	187.5 mg bd
30 - 40 kg	250 mg bd

Age	*Dose*
12 - 18 years	500 mg bd

Flucloxacillin i/v

Age	*Dose*
1 month - 18 years	25 mg/kg every 6 hours (max 2 g every 6 hours)

Flucloxacillin oral

Age	*Dose*
1 month - 2 years	125 mg qds
2 - 10 years	250 mg qds
10 - 18 years	500 mg qds

SKIN AND SOFT TISSUE INFECTIONS - Dermatophyte

IMPORTANT Before prescribing antimicrobials

Consult Dermatologists

Take appropriate samples

- Skin scrapings
- Nail clippings
- Hair

INFECTION	USUAL ORGANISMS	ANTIMICROBIALS	COMMENTS
Skin Infections in General	*Trichophyton sp.* *Epidermophyton sp.* *Microsporum sp*	For localised infections **Miconazole cream 2%** Apply twice daily or **Clotrimazole cream 1%** Apply 2 - 3 times a day	Skin scrapings should be sent to Microbiology
Scalp Ringworm and Extensive Tinea infections	*As above*	If oral therapy appropriate due to site, severity or extent of infection **First line** **Terbinafine oral** Duration: Tinea capitis 4 weeks Tinea pedis 2-4 weeks Tinea corporis 4 weeks If failed on first line **Itraconazole oral**	Discuss with dermatologist Monitor LFTs monthly Not licenced for use in children Discontinue if signs of hepatitus develop
Pityriasis versicolor	*Malassezia furfur*	**Topical** **Selenium sulphide shampoo** (Selsun®) 5-18 years Dilute with water and apply to affected area. Leave for 10 minutes before rinsing off with water. Apply once daily for 7 days. Repeat course if neccessary.	In children less than 5 years or in relapses seek advice from Dermatologist. Commonly seen in children after contact with water (eg swimming)
Nail Infections Onychomycosis	*Trichophyton sp.* *Epidermophyton sp.*	**Terbinafine oral** Duration: 6 weeks - 3 months Up to six months may be needed for toe nail infection	Nail clippings should be sent to Microbiology Monitor LFTs monthly Efficacy to topical preparations is questionable

Itraconazole oral

Tinea capitis

Age	*Dose*
1 month - 18 years	3-5 mg/kg (max 200 mg) od for 2-6 weeks

Terbinafine oral

Adjust dose in renal impairment

Age over 1 year	
Body weight	*Dose*
10 - 20 kg	62.5 mg od
20 - 40 kg	125 mg od
Over 40 kg	250 mg od

Itraconazole oral

Tinea pedis

Age	*Dose*
1 month - 12 years	3-5 mg/kg (max 100 mg) od for 30 days
12 - 18 years	100 mg od for 30 days or 200 mg bd for 7 days

Itraconazole oral

Tinea corporis

Age	*Dose*
1 month - 12 years	3-5 mg/kg (max 100 mg) od for 15 days
12 - 18 years	100 mg od for 15 days or 200 mg bd for 7 days

SKIN AND SOFT TISSUE INFECTIONS - Candida

INFECTION	USUAL ORGANISMS	ANTIMICROBIALS	COMMENTS
Skin Candidiasis	*Candida albicans* *Candida glabrata* *Candida kruzei* *Candida tropicalis etc*	**Topical** **Clotrimazole cream 1%** Apply bd or **Miconazole cream 2%** Apply bd **Systemic** **Fluconazole oral** for 2-4 weeks (for up to 6 weeks in tinea pedia) Max duration 6 weeks	Duration of therapy will depend on the clinical condition Consider oral treatment if no response to topical or recurrent infection or immunocompromised. *Candida glabrata* Widespead infection -sensitivities may be required before considering systemic fluconazole Non-albicans candida are more likely to be resistant
Vulval/vaginal		**Fluconazole oral** Single dose	

Fluconazole oral

Single dose

Age	*Dose*
Less than 16 yrs (post puberty)	150 mg od
16 - 18 years	150 mg od

Fluconazole oral

Age	*Dose*
1 month - 18 years	3 mg/kg od max 50mg

SKIN AND SOFT TISSUE INFECTIONS - Viral

Infection Prevention and Control guidance:

Isolate the patient using respiratory precautions (green sign). Inform the Infection Prevention and Control Team. Exposure to non-immune high risk contacts such as pregnant women and immunocompromised patients will be assessed and testing for immunity or provision of vaccine advice will be provided.

INFECTION	USUAL ORGANISMS	ANTIMICROBIALS	COMMENTS
Herpes simplex Mucocutaneous infections	*Herpes simplex virus*	**Aciclovir cream 5%** Apply to lesions at first sign of attack 5 times a day for 5 days or **Aciclovir oral for 5 days** If eczema herpeticum, consider **Aciclovir i/v STANDARD dose** If immuno-compromised ***Aciclovir i/v HIGH dose**	
Chickenpox Complicated Chickenpox eg pneumonia and immunocompromised	*Varicella virus*	**Uncomplicated** No need for treatment Complicated **Aciclovir i/v STANDARD dose** if immunocompromised **Aciclovir i/v HIGH dose**	Consider appropriate antibiotic cover for secondary bacterial infections
Shingles	*Herpes-zoster virus*	**Uncomplicated** No need for treatment Complicated **Aciclovir i/v STANDARD dose** if immunocompromised **Aciclovir i/v HIGH dose** A course longer than 5 days may be neccessary.	Consider appropriate antibiotic cover for secondary bacterial infections

Aciclovir i/v STANDARD dose

- Adjust dose in renal impairment
- Dose based on ideal weight for height
- Infuse over 60 minutes

Age	*Dose*
1 - 3 months	20 mg/kg every 8 hours for 14 days
3 months - 12 years	250 mg/m^2 every 8 hours for at least 5 days
12 - 18 years	5 mg/kg every 8 hours for 5 days

Aciclovir i/v HIGH dose

- Adjust dose in renal impairment
- Dose based on ideal weight for height
- Infuse over 60 minutes

Age	*Dose*
1 - 3 months With disseminated herpes	20 mg/kg every 8 hours for 14 days
3 months - 12 years	500 mg/m^2 every 8 hours for 5 days
12 - 18 years	10 mg/kg every 8 hours for 5 days

Aciclovir oral for 5 days

Age	*Dose*
1 month - 2 years	100 mg five times daily
2 - 18 years	200 mg five times daily

SKIN AND SOFT TISSUE INFECTIONS - Arthropod infestatons

Observe infection control measures

INFECTION	USUAL ORGANISMS	ANTIMICROBIALS	COMMENTS
Scabies	*Sarcoptes scabiei*	IST CHOICE **Permethrin 5% cream** Apply over the whole body, neck down and wash off after 8 -12 hours. Repeat after 7 days 2ND CHOICE **Malathion 0.5% liquid** Apply over the whole body and wash off after 24 hours Repeat after 7 days If less than 6 months under medical supervision	If in doubt consult with Dermatologists to confirm diagnosis Inform health visitor and school nurse Inform Infection Control Team Infection Control procedures should be followed If evidence of cross infection (ie 2 cases or more) then all patients & staff should be treated All members of the affected household should be treated, paying particular attention to the web of the fingers and toes and brushing under the ends of nails Advise washing bedding and clothing at 40 °C minimum Advise about hygiene
Head Lice and Body louse	*Pediculus capitis*	**Use nit combs** Apply conditioner and wet-comb every 3-4 days for 2 weeks **If not responding** **Malathion 0.5% liquid** Apply to hair and wash off after 12 hours Repeat after 7 days Apply conditioner and wet-comb every 3-4 days for 2 weeks after Completing treatment Age less than 6 months Unlicensed use	Two applications 7 days apart to prevent lice emerging from eggs that survive the first application Advise about hygiene Advise washing bedding and clothing at 40 °C minimum

BONE AND JOINT INFECTIONS [7]

IMPORTANT Before prescribing antibiotics

- **History of MRSA** - contact Microbiologist
- Check for previous microbiology results
- Treatment duration may be several weeks, according to the microbiology results

Take appropriate samples

- Blood cultures
- Other orthopaedic samples when available
- Wound swabs/other septic foci

INFECTION	USUAL ORGANISMS	ANTIMICROBIALS	COMMENTS
OSTEOMYELITIS	*Staphylococcus aureus* *Streptococcus sp* *Haemophillus influenzae* Anaerobes Gram-Negative organisms Known MRSA	**Flucloxacillin i/v** Add if less than 5 years **and** not immunised for *H influenzae* **Ceftriaxone i/v** Discuss with Microbiologist Discuss with Microbiologist	Blood culture and other relevant orthopaedic samples should be taken before initiation of therapy if possible Review according to culture and sensitivities i/v therapy for at least 1-2 weeks in the first instance, followed by oral therapy for a total of 4-6 weeks. Chronic infection may need up to 12 weeks or longer If negative bacteriology: discuss with Microbiologist P Penicillin allergy: Contact Microbiologist
SEPTIC ARTHRITIS	*Staphylococcus aureus* *Beta haemolytic Streptococci*	**Flucloxacillin i/v** Add if less than 5 years **and** not immunised for H *influenzae* **Ceftriaxone i/v**	Take appropriate sample: - aspirate joint for culture and sensitivities - blood cultures P Penicillin allergy: seek advice from Microbiologist Review in the light of cultures i/v therapy for at least 2 weeks followed by oral therapy for total of 4-6 weeks Consultants may advise higher doses in some patients

Ceftriaxone i/v

Infusion over 30 minutes

Age	*Dose*
1 month - 12 years	Under 50 kg 80mg/ kg od Over 50 kg 2-4 g daily
12 - 18 years	2 -4 g daily

Flucloxacillin i/v

Age	*Dose*
1 month - 18 years	50 mg/kg (max 2 g) every 6 hours

Flucloxacillin oral

Age	*Dose*
1 month - 2 years	125 mg qds
2 - 10 years	250 mg qds
10 - 18 years	500 mg qds

ENT INFECTIONS [7]

IMPORTANT Before prescribing antibiotics

- **History of MRSA** - contact Microbiologist
- Check for previous microbiology results

Take appropriate samples

- Pus and aspirate when available
- Throat swabs/ ear swabs if appropriate
- Blood cultures if systemic unwell

INFECTION	USUAL ORGANISMS	ANTIMICROBIALS	COMMENTS
Tonsillitis / Pharyngitis	*Majority viral* Group A, C, G *Streptococci*	Treatment not required unless bacterial infection suspected or confirmed Mild infection **Penicillin V oral for 10 days** Severe infection **Benzylpenicillin i/v** for 48 hours followed by oral as above Total duration: 10 days	P Penicillin allergy • 1 month to 6 months **Clarithromycin oral** for 7 days • Over 6 months **Azithromycin oral for 3 days** If i/v needed, **Clarithromycin i/v**
Peritonsillar Abscess (Quinsy)	*Group A, C, G Streptococci* + / - *Anaerobes*	**Benzylpenicillin i/v** plus **Metronidazole i/v** Change to oral **Co-amoxiclav** as clinical condition improves Total duration: 10 days	Discuss with ENT surgeons P Penicillin allergy: seek advice from Microbiologist

Azithromycin oral

10 mg/kg (max 500 mg) od
or

Body weight	*Dose*
15 - 25 kg	200 mg od
26 - 35 kg	300 mg od
36 - 45 kg	400 mg od
Over 45 kg	500 mg od

Benzylpenicillin i/v

Age	*Dose*
1 month - 18 years	25 mg/kg every 4-6 hours increasing to 50 mg/kg (max 2.4g) every 4 hours

Clarithromycin i/v

Age	*Dose*
1 month - 12 years	7.5 mg/kg every 12 hours
12 - 18 years	500 mg every 12 hours

Clarithromycin oral

Age one month - 12 years	
Body weight	*Dose*
under 8 kg	7.5 mg/kg bd
8 - 11 kg	62.5mg bd
12 - 19 kg	125mg bd
20 - 29 kg	187.5 mg bd
30 - 40kg	250 mg bd

Age	*Dose*
12 - 18 years	500 mg bd

Co-amoxiclav oral

Age	*Dose*
1 month - 1 year	125/31susp 0.5 mL/ kg tds
1 - 6 years	250/62 susp 5 mL tds
6 - 12 years	250/62 susp 10 mL tds
12 - 18 years	500/125 tablets 1 tablet tds

Metronidazole i/v

Infusion over 20 - 30minutes

Age	*Dose*
1 month - 2 months	7.5 mg/kg every 12 hours
2 month - 18 years	7.5 mg/kg (max 500 mg) every 8 hours

Penicillin V oral

Age	*Dose*
1 month - 1 year	62.5 mg qds
1 - 6 years	125 mg qds
6 - 12 years	250 mg qds
12 - 18 years	500 mg qds

in severe infections
at least 12.5 mg/kg qds
Maximum 1 g qds

ENT INFECTIONS continued [7]

IMPORTANT Before prescribing antibiotics

- **History of MRSA** - contact Microbiologist
- Check for previous microbiology results

Take appropriate samples

- Pus and aspirate when available
- Throat swabs/ ear swabs if appropriate
- Blood cultures if systemic unwell

INFECTION	USUAL ORGANISMS	ANTIMICROBIALS	COMMENTS
Otitis Externa	Group A, C or G Streptococci Anaerobes Staphylococcus aureus	May not be infective. Often respond to careful cleansing and topical steroid drops Consider systemic antibiotics if spreading cellulitis or unwell **initially Flucloxacillin oral for 48 hours** Then review according to culture and sensitivity Total duration 5-10 days depends on culture, and sensitivities	Take ear swabs for culture P Penicillin allergy: • 1 month to 6 months **Clarithromycin oral for 5 days** • Over 6 months **Azithromycin oral for 3 days**
Acute Otitis Media	*Streptococcus pneumoniae* *Haemophilus influenzae*	Mainly viral. 80% resolve without antimicrobials **If antibiotic needed** **Amoxicillin oral** if no improvement after 48 hours **Consider Co-amoxiclav oral** Duration 5 days	P Penicillin allergy • 1 month to 6 months **Clarithromycin oral for 5 days** • Over 6 months **Azithromycin oral for 3 days**
Chronic or Discharging Otitis Media	*Streptococcus pneumoniae* *Haemophilus influenzae* *Staphylococcus aureus*	Discuss with ENT consultants Consult Microbiologist regarding suitable antibiotics	Swab should be taken for culture
Acute Sinusitis	*Streptococcus pneumoniae* *Haemophilus influenzae* Viral	Consider antibiotics if persistent or severe symptoms **Amoxicillin oral** In severe infection initial parental therapy with **Co-amoxiclav i/v** **or** **Cefuroxime i/v** Total duration 7 days	P Penicillin allergy • 1 month to 6 months **Clarithromycin oral for 7 days** • Over 6 months **Azithromycin oral for 3 days**

ENT INFECTIONS continued [7]

Amoxicillin oral

Body weight	*Dose*
1 month - 1 year	125 mg tds
1 - 5 years	250 mg tds
5 - 18 years	500 mg tds

Azithromycin oral

10 mg/kg (max 500 mg) od or

Body weight	*Dose*
15 - 25 kg	200 mg od
26 - 35 kg	300 mg od
36 - 45 kg	400 mg od
Over 45 kg	500 mg od

Cefuroxime i/v

Age	*Dose*
1 month - 18 years	20 mg/kg (max 750 mg) every 8 hours increase to 50 mg/kg (max 1.5 g) every 6-8 hours in severe infections

Clarithromycin i/v

Age	*Dose*
1 month - 12 years	7.5 mg/kg bd
12 - 18 years	500 mg bd

Clarithromycin oral

Age one month - 12 years

Body weight	*Dose*
less than 8 kg	7.5 mg/kg bd
8 - 11 kg	62.5mg bd
12 - 19 kg	125mg bd
20 - 29 kg	187.5 mg bd
30 - 40kg	250 mg bd

Age	*Dose*
12 - 18 years	500 mg bd

Co-amoxiclav i/v

Age	*Dose*
1 month - 3 months	30 mg/kg every 12 hours
3 months - 18 years	30 mg/kg (max 1.2 g) every 8 hours

Co-amoxiclav oral

Age	*Dose*
1 month - 1 year	125/31susp 0.5 mL/ kg tds
1 - 6 years	250/62 susp 5 mL tds
6 - 12 years	250/62 susp 10 mL tds
12 - 18 years	500/125 tablets 1 tablet tds

Flucloxacillin oral

Age	*Dose*
1 month - 2 years	125 mg qds
2 - 10 years	250 mg qds
10 - 18 years	500 mg qds

Metronidazole oral

Age	*Dose*
1 - 2 months	7.5 mg/kg every 12 hours
2 months - 12 years	7.5 mg/kg (max 400 mg) every 8 hours
12 years - 18 years	400 mg every 8 hours

Penicillin V oral

Age	*Dose*
1 month - 1 year	62.5 mg qds
1 - 6 years	125 mg qds
6 - 12 years	250 mg qds
12 - 18 years	500 mg qds

in severe infections
at least 12.5 mg/kg qds
Maximum 1 g qds

ORAL AND MAXILLOFACIAL SURGERY INFECTIONS

IMPORTANT Before prescribing antimicrobials

- **History of MRSA** - contact Microbiologist
- Check for previous microbiology results

Take appropriate samples

- Pus and aspirate when available
- Throat swabs/ ear swabs if appropriate
- Blood cultures if systemic unwell

INFECTION	USUAL ORGANISMS	ANTIMICROBIALS	COMMENTS
Acute infections including tissue space abscesses secondary to dental sepsis etc.	Oral and upper respiratory flora	**Co-amoxiclav oral** Duration 5 days	P Penicillin allergy **Metronidazole oral**

Co-amoxiclav oral

Age	*Dose*
1 month - 1 year	125/31susp 0.5 mL/ kg tds
1 - 6 years	250/62 susp 5 mL tds
6 - 12 years	250/62 susp 10 mL tds
12 - 18 years	500/125 tablets 1 tablet tds

Metronidazole oral

Age	*Dose*
1 - 2 months	7.5 mg/kg every 12 hours
2 months - 12 years	7.5 mg/kg (max 400 mg) every 8 hours
12 years - 18 years	400 mg every 8 hours

EYE INFECTIONS [7]

IMPORTANT Before prescribing antimicrobials

- **History of MRSA** - contact Microbiologist
- Check for previous microbiology results

Take appropriate samples

- Eye swabs for culture, gram stain and for NUR if chlamydia suspected
- Slide for bacteria

INFECTION	USUAL ORGANISMS	ANTIMICROBIALS	COMMENTS
Conjunctivitis Bacterial usually purulent	*Staphylococcus aureus* *Haemophilus influenzae* *Streptococcus pneumoniae* *Group A C G Streptococci*	**Chloramphenicol** 0.5% eye drops 2 hourly during the day and 1% ointment at night for 5 days If inadequate response contact microbiologist	
	If MRSA	Contact Microbiologist	Seek advice from Consultant Ophthalmologist Consider vertical transmission in babies under 6 months
	Confirmed *Chlamydia*	• 1 month to 6 months **Clarithromycin oral for 14 days** • Over 6 months **Azithromycin oral 7 days**	Consider swabs for virology
Viral Conjunctivitis Usually non purulent	*Herpes* *Adenovirus*		
Eye lid infections		**Chloramphenicol eye ointment QDS**	Take conjuctival swabs and blood cultures
Periorbital cellulitis	*Staphylococcus aureus* *Haemophilus influenzae* *Streptococcus pneumoniae* *Anaerobes*	**Flucloxacillin i/v** **plus** **Cefotaxime i/v** **If sinusitis likely or confirmed add Metronidazole i/v**	In severe infections discuss with Opthalmologist P Penicillin allergy: seek advice for Microbiologist Review in the light of cultures Consider oral following clinical improvement Co-amoxiclav oral Total duration 7-10 days

Azithromycin oral

10 mg/kg (max 500 mg) od
or

Body weight	*Dose*
15 - 25 kg	200 mg od
26 - 35 kg	300 mg od
36 - 45 kg	400 mg od
Over 45 kg	500 mg od

Cefotaxime i/v

Age	*Dose*
1 month - 18 years	50 mg/kg every 6 hours Max 12g daily

Clarithromycin oral

Body weight	*Dose*
under 8 kg	7.5 mg/kg bd
8 - 11 kg	62.5mg bd
12 - 19 kg	125mg bd
20 - 29 kg	187.5 mg bd
30 - 40kg	250 mg bd

Age	*Dose*
12 - 18 years	500 mg bd

Co-amoxiclav oral

Age	*Dose*
1 month - 1 year	125/31susp 0.5 mL/kg tds
1 - 6 years	250/62 susp 5 mL tds
6 - 12 years	250/62 susp 10 mL tds
12 - 18 years	500/125 tablets 1 tablet tds

Flucloxacillin oral

Age	*Dose*
1 month - 2 years	125 mg qds
2 - 10 years	250 mg qds
10 - 18 years	500 mg qds

Flucloxacillin i/v

Age	*Dose*
1 month - 18 years	25 mg/kg every 6 hours Increasing to 50 mg/kg every 6 hours) (max 2 g every 6 hours)

Metronidazole i/v

Age	*Dose*
1 - 2 month	7.5 mg/kg every 12 hours
2 month - 18 years	7.5 mg/kg (max 500 mg every 8 hours)

GASTRO-INTESTINAL INFECTIONS [7]

IMPORTANT Before prescribing antibiotics

- **History of MRSA** – contact Microbiologist
- Check for previous microbiology results
- Check travel history/farm visits

Take appropriate samples
- Stool

INFECTION	USUAL ORGANISMS	ANTIMICROBIALS	COMMENTS
Oral thrush		Nystatin suspension or Fluconazole oral for 5 days	
Acute Gastro-enteritis	*Viral-most common* *Salmonella sp.* *Shigella sp.* *Campylobacter sp.* *E coli 157*	Usually NOT required Invasive infection requires antibiotics - take blood cultures if septic Antimicrobial treatment is recommended if persistent symptoms, imunocompromised or less than 3 months age	Cases should be barrier nursed Food poisoning is a notifiable disease Blood culture may be needed to rule out invasive salmonellosis
Antibiotic associated diarrhoea	*Clostridium difficile*	Ist line **Metronidazole oral for 14 days** 2nd line following Microbiology advice **Vancomycin oral for 14 days**	STOP other antimicrobials if possible & discuss with Microbiologist If no response after treatment seek advice from Microbiologist
Typhoid fever	*Salmonella typhi*	Discuss with Microbiologist	Suspect infection in febrile patients with a history of foreign travel Barrier nurse
Biliary Infections **Cholangitis** **Cholecystits**	*Coliforms* *Gram negative organisms*	Discuss with Liver Unit (Leeds) or Paediatric gastroenterologist (Sheffield)	

INFECTION	USUAL ORGANISMS	ANTIMICROBIALS	COMMENTS
Eradication of Helicobacter pylori	Helicobacter pylori	Discuss with Gastroenterologist	
Liver abscess	Coliforms Streptococci Anaerobes	Seek advice from Hepatologist (Leeds) and Paediatric Surgeon	
Viral Hepatitis B & C		Seek advice from Hepatologist (Leeds)	

Metronidazole oral

Age	*Dose*
1 - 2 months	7.5 mg/kg every 12 hours
2 months - 12 years	7.5 mg/kg (max 400 mg) every 8 hours
12 years - 18 years	400 mg every 8 hours

Fluconazole oral

Age	*Dose*
1 month - 18 years	3 mg/kg od Max 50mg

Nystatin suspension

100 000 units /mL
1mL QDS after feed

Vancomycin oral

Age	*Dose*
1 month - 5 years	5 mg/kg qds
5 - 12 years	62.5 mg qds
12 - 18 years	125 mg qds

SURGICAL PROPHYLAXIS [7, 19]

Principles of Surgical Prophylaxis

Choice of antimicrobials	The selected antimicrobial for prophylaxis must cover the expected pathogen for that operative site
MRSA carriage	MRSA carriage should be eradicated with intranasal mupirocin and/or octenisan prior to surgery.
History of MRSA	A glycopeptide must be given, for example Teicoplanin.
Timing of administration	Antimicrobial should be administered before tourniquet is applied and 30-60 minutes before skin incision
Dose of antimicrobials	A single dose of antimicrobial with a long enough activity through the operation is recommended. A longer course of 24 hours may be necessary in high risk surgery
Additional dose	Should be considered if major intraoperative blood loss
Routes of administration	Prophylactic antimicrobials should be administered intravenously.
Writing prescription	On the 'once only' section of the Medicine Chart.

Classification of surgery

Class	**Type**
Clean	No inflammation No entry into respiratory, alimentary or urinary tract
Clean - contaminated	Entry into respiratory, alimentary or urinary tract but without significant spillage
Contaminated	Acute infection (without pus) Visible contamination of the wound Compound open injuries less than 4 hours old
Dirty	In the presence of pus Previously perforated hollow viscus Visible contamination of the wound Compound open injuries more than 4 hours old

SURGICAL PROPHYLAXIS [7, 19]

Timing: administer i/v antimicrobial 30-60 minutes before incision

PROCEDURE	1st line	Patients with Penicillin allergy	Patients with history of MRSA
Clean Surgery: e.g. hernias, circumcision tonsillectomy	**No antimicrobials**		
Appendicectomy	**Cefuroxime i/v** **plus** **Metronidazole i/v** If perforation **Continue for 5 days**	Non-life threatening allergy **Cefuroxime i/v** **plus** **Metronidazole i/v** Life threatening **Gentamicin i/v** **plus** **Metronidazole i/v** If perforation **Continue for 5 days**	**Gentamicin i/v** **plus** **Metronidazole i/v** **plus** **Teicoplanin i/v** If perforation **Continue for 5 days**
Orthopaedic surgery	**Cefuroxime i/v** every 8 hours for 3 doses If trauma Add Metronidazole i/v every 8 hours for 3 doses	Non-life threatening allergy **Cefuroxime i/v** Life threatening **Gentamicin i/v** **plus** **Teicoplanin i/v** If trauma Add Metronidazole i/v every 8 hours for 3 doses	**Gentamicin i/v** **plus** **Teicoplanin i/v** If trauma Add Metronidazole i/v every 8 hours for 3 doses
Major head and neck surgery, **Fracture of mandibles**	**Co-amoxiclav i/v** at induction plus • **3 months or older** Two further doses every 8 hours • **1 - 3 months** One further dose after 12 hours Further doses may be given at the discretion of the Surgeon.	Non-life threatening allergy **Cefuroxime i/v** plus **Metronidazole** Life threatening allergy **Teicoplanin i/v** plus **Gentamicin i/v** plus **Metronidazole i/v**	**Gentamicin i/v** **plus** **Metronidazole i/v** **plus** **Teicoplanin i/v**
Clinical Radiology			
Splenectomy Vaccination Please refer to post-splenectomy prophylaxis policy (Appendix G)	**Co-amoxiclav i/v**	Non-life threatening allergy **Cefuroxime i/v** Life threatening allergy Discuss with Microbiologist	**Gentamicin i/v** **plus** **Metronidazole i/v** **plus** **Teicoplanin i/v**

Cefuroxime i/v	Co-amoxiclav i/v	Gentamicin i/v	Metronidazole i/v	Teicoplanin i/v
50 mg/kg Max 1.5 g	30 mg/kg Max 1.2 g	2.5 mg/kg	30 mg/kg Max 500 mg	10 mg/kg Max 400 mg

MEDICAL PROPHYLAXIS [7, 21]

<table>
<tr><th>INFECTION</th><th>ANTIMICROBIALS</th><th></th></tr>
<tr><td rowspan="4">Meningococcal Disease/ Meningitis CONTACTS

[22]</td><td>CIPROFLOXACIN
Children one month to 5 years
Children aged 5 to 12 years
Children over 12 years and adults</td><td>CIPROFLOXACIN
30 mg/kg (max 125 mg) single dose
250 mg single dose
500 mg single dose</td></tr>
<tr><td>RIFAMPICIN
Infants under 12 months of age</td><td>Rifampicin oral
5 mg/kg (max 600 mg)
every 12 hours for 2 days</td></tr>
<tr><td>Children aged 1 – 12 years</td><td>Rifampicin oral
10 mg/kg (max 600 mg)
every 12 hours for 2 days</td></tr>
<tr><td>Children over 12 years and adults</td><td>Rifampicin oral
600 mg every 12 hours for 2 days</td></tr>
<tr><td></td><td>Pregnancy</td><td>Ceftriaxone
250 mg i/m
or
Azithromycin
500 mg single dose</td></tr>
<tr><td rowspan="4">Haemophilus Influenzae type b Disease CONTACTS</td><td>• Children who have never received any immunisation</td><td>Age under 10 years
Three doses of DTaP/IPV/Hib vaccine</td></tr>
<tr><td>• Children who have never received Hib vaccine, but have been immunised against diphtheria, tetanus, pertussis, and polio</td><td>Age under 1 years
Three doses of Hib/MenC vaccine
Age between 1 and 10 years
One dose of Hib/MenC vaccine</td></tr>
<tr><td>• Children who have received Hib vaccine in infancy but who did not receive a booster dose of Hib containing vaccine after the age of 12 months</td><td>Age between 1 and 10 years
One dose of Hib/MenC vaccine</td></tr>
<tr><td>• At risk individuals (under 10 years, immunosuppressed, asplenic), index case and all household contacts</td><td>Rifampicin for 4 days<table><tr><th>Age</th><th>Dose</th></tr><tr><td>1 month - 3 months</td><td>10 mg/kg od</td></tr><tr><td>3 months - 10 years</td><td>20 mg/kg (max 600) OD</td></tr></table></td></tr>
<tr><td>Whooping Cough CONTACTS</td><td>Antibiotic prophylaxis to unimmunised or partially immunised vulnerable contacts following discussion with local HPU</td><td>Consultant in Communicable Diseases
0900 – 1700 01142 321117
1700 – 0900 via switch board</td></tr>
<tr><td>Post splenectomy / Asplenic patients (or sickle cell disease patients)</td><td>Penicillin V oral

Penicillin allergy:
Erythromycin oral

Vaccinations
Please refer to Splenectomy Guidelines (Appendix G)</td><td>Penicillin V oral<table><tr><th>Age</th><th>Dose</th></tr><tr><td>Less than 1 year</td><td>62.5 mg bd</td></tr><tr><td>1 - 5 years</td><td>125 mg bd</td></tr><tr><td>5 -18 years</td><td>250 mg bd</td></tr></table>Erythromycin oral<table><tr><th>Age</th><th>Dose</th></tr><tr><td>one month - 2 years</td><td>125 mg bd</td></tr><tr><td>2 - 8 years</td><td>250 mg bd</td></tr><tr><td>8 -18 years</td><td>500 mg bd</td></tr></table></td></tr>
<tr><td>Tuberculosis Prophylaxis
Susceptible close contacts or those who have become tuberculin positive</td><td>Discuss with Paediatric consultant TB specialist and refer to NICE guidance</td><td></td></tr>
</table>

PROPHYLAXIS AGAINST INFECTIVE ENDOCARDITIS [16]

Introduction

Antibiotics have been offered routinely as a preventative measure to help people at risk of infective endocarditis undergoing interventional procedures. However, there is little evidence to support this practice. Antibiotic prophylaxis has not been proven to be effective and there is no clear association between episodes of infective endocarditis and interventional procedures. Any benefits of prophylaxis need to be weighed against the risks of adverse effects for the patient and of antibiotics resistance developing. As a result this guidance recommends that antibiotic prophylaxis is no longer offered routinely for defined interventional procedures.

Summary of recommendations

Adults and children with structural cardiac conditions.

Regard people with the following cardiac conditions as being at risk of developing infective endocarditis:

- Acquired valvular heart disease with stenosis and regurgitation
- Valve replacement
- Structural congenital heart disease, including surgically corrected or palliated structural conditions, but excluding isolated septal defect, fully repaired patent ductus arteriosus and closure devices that are judged to be endothelial
- Hypertrophic cardiomyopathy
- Previous infective endocarditis

Advice

Offer people at risk of infective endocarditis clear and consistent information about prevention, including:

- The benefits and risks of antibiotic prophylaxis, and an explanation of why antibiotic prophylaxis is no longer routinely recommended
- The importance of maintaining good oral health
- Symptoms that may indicate infective endocardits and when to seek expert advice
- The risks of undergoing invasive procedures, including non-medical procedures such as body piercing or tattooing.

When to offer prophylaxis

Do not offer antibiotic prophylaxis against infective endocarditis-

- To people undergoing dental procedures
- To people undergoing non-dental procedures at the following sites:
  1. upper and lower gastrointestinal tract
  2. genitourinary tract: this includes urological, gynaecological and obstetric procedure and childbirth
  3. upper and lower respiratory tract , this includes ear, nose and throat procedures and bronchoscopy
- Do not offer chlorhexidine mouthwash as prophylaxis against infective endocarditis to people at risk undergoing dental procedures
- Discuss with microbiology if the patients' clinical status is of a complex nature.

Managing infection

- Investigate and treat promptly any episodes of infection in people at risk of infective endocarditis to reduce the risk of endocarditis developing
- Discuss with microbiology if a person at risk of infective endocarditis is receiving antimicrobial therapy because they are undergoing gastrointestinal or genitourinary procedures at a site where there is a suspected infection.

REFERENCES

Introduction

1 Resistance to antibiotics and other antimicrobial agents.
Report of the House of Lords Select Committee on Science and Technology.
London: Stationery Office, 1998.

2 Chief Medical Officer
Winning Ways: Working together to reduce Healthcare Associated Infection in England.
Department of Health, December 2003.

3 Saving Lives toolkit

4 The Health Act 2006
Code of Practice for the Prevention and Control of Health Care associated Infections
General Health Protection, Department of Health, 2006.

Update:
The Health and Social Care Act 2008
Code of Practice for the Prevention and Control of Health Care associated Infections
http://www.dh.gov.uk/prod_consum_dh/groups/dh_digitalassets/documents/digitalasset/dh_110435.pdf

5 Standing Medical Advisory Committee: Sub-Group on Antimicrobial resistance.
The path of least resistance.
London: Department of Health, 1998.

6 Saving Lives: reducing infection, delivering clean and safe care.
Antimicrobial Prescribing
A summary of best practice
Department of Health 2007

For all infections

7 British National Formulary for Children (BNFC) 2013-14.

8 Health Protection Agency 2010
Management of infection guidance for primary care for consultation and local adaptation
July 2010
http://www.hpa.org.uk/web/HPAwebFile/HPAweb_C/1194947333801

9 British Society of Antimicrobial Chemotherapy
Treatment of Hospital Infections
www.bsac.org.uk/pyxis

10 The Sanford Guide to Antimicrobial Therapy 2010

11 The Infectious Diseases Manual (2nd Ed)
Blackwell Publishing

12 National Institute of Clinical Excellence
Feverish illness in children Clinical guideline
NICE 2007
http://www.nice.org.uk/nicemedia/live/11010/30523/30523.pdf

Respiratory

13 The British Thoracic Society
Guidelines for the management of community acquired pneumonia in Children: Update 2011
Thorax 2011:
http://www.brit-thoracic.org.uk/Portals/0/Clinical%20Information/Pneumonia/Guidelines/CAP%20children%20October%202011.pdf

14 National Institute of Clinical Excellence
Clinical diagnosis and management of tuberculosis, and measures for its prevention and control
NICE 2011
http://www.nice.org.uk/nicemedia/live/13422/53642/53642.pdf

Urinary Tract infections

15 National Institute of Clinical Excellence
Management of suspected bacterial urinary tract infection in Children. Clinical guideline 54
NICE 2007
http://www.nice.org.uk/nicemedia/live/11819/36032/36032.pdf

Central Nervous System

16 National Institute of Clinical Excellence
Bacterial meningitis and meningococcal septicaemia Clinical guideline 102
NICE 2010
http://www.nice.org.uk/nicemedia/live/13027/49339/49339.pdf

Endocarditis

17 Leeds Guidelines

18 National Institute of Clinical Excellence
Prophylaxis against infective endocarditis in adults and children undergoing interventional procedures
NICE 2008
http://www.nice.org.uk/nicemedia/live/11938/40039/40039.pdf

Surgical Prophylaxis

19 Scottish Intercollegiate Guideline Network
Surgical Prophylaxis in Surgery. Guideline 104. 2012
http://www.sign.ac.uk/pdf/sign104.pdf

Medical Prophylaxis

20 Immunization against Infection Diseases
http://www.dh.gov.uk/prod_consum_dh/groups/dh_digitalassets/documents/digitalasset/dh_131000.pdf

21 Health Protection Agency
Guidance for public health management of meningococcal disease in the UK.
http://www.hpa.org.uk/webc/HPAwebFile/HPAweb_C/1194947389261

APPENDIX A THERAPEUTIC DRUG MONITORING

Aminoglycosides (Gentamicin, Tobramycin)

Paediatric use of gentamicin is mainly restricted to treatment of endocarditis, cystic fibrosis in the neonatal period, for patients with penicillin allergies for surgical prophylaxis and for the treatment of serious infections. Amikacin and tobramycin are used in cases of resistance to gentamicin.

Aminoglycosides are excreted via the kidneys and therefore accumulation occurs in renal impairment. The side effects associated with toxic levels are hearing and balance disorders and further renal impairment. These drugs should be used with caution particularly in children with renal impairment.

Patients and their carers must be informed of potential side effects.

Dose calculation and monitoring serum concentration

- The dose and dose interval must be based on child's ideal body weight and renal function.
- Serum concentrations must be monitored to avoid both excessive and sub-therapeutic levels.
- The doses must be given at the times prescribed.
- Serum concentrations must be monitored according to the regimens.
- Time of dose and time of blood sample must be documented at all times, otherwise the results can not be acted upon.
- The treatment with aminoglycosides must be reviewed daily.

Renal function must be monitored regularly throughout the treatment.

Glycopeptides (Vancomycin and Teicoplanin)

Glycopeptides are used for some surgical prophylaxis and for the treatment of infections on the advice of microbiologists.

Intravenous vancomycin dose calculations and monitoring serum concentrations

- Vancomycin dose and dose interval must be based on patient's ideal body weight and renal function when treating infections.
- Serum concentrations must be monitored to avoid both excessive and subtherapeutic levels.
- The doses must be given at the times prescribed.
- Serum concentrations must be monitored according to the regimens.
- Time of dose and time of blood sample must be documented at al times, otherwise the results can not be acted upon.
- The treatment with vancomycin must be reviewed daily.

Renal function must be monitored regularly throughout the treatment.

Teicoplanin serum levels require monitoring in deep seated infections to ensure that adequate levels have been achieved.

APPENDIX B Therapeutic drug monitoring - Gentamicin Conventional Dose Regimen

Patient details required to advise /revise Gentamicin dose	• Clinical diagnosis • Height, weight, age • Serum creatinine • Gentamicin - dose, times of doses - serum levels and times
Prescribing Gentamicin	2.5 mg/kg every 8 hours
Therapeutic serum levels Pre dose (trough) levels – immediately before dose. Post dose (peak) – one hour after	 Less than 2mg/L 5 -10 mg/L
Administration	Intravenous bolus over 3 – 5 minutes or infusion over 30 minutes. Pharmacy can prepare syringes
Monitoring	Blood levels on the 3rd dose. **Important** • Blood samples must be taken via a venepuncture
Blood sampling times	Pre dose (trough) levels – immediately before dose. Post dose (peak) – one hour after

APPENDIX C Therapeutic Drug Monitoring - Teicoplanin

Patient details required to advise /revise Teicoplanin dose	• Clinical diagnosis • Height, weight, age • Serum creatinine • Teicoplanin - dose, times of doses - serum levels and times
Prescribing Teicoplanin	1 month – 18 years 10 mg/kg (max 400 mg) every 12 hours for 3 doses then 6 mg/kg (max 200 mg) once daily In severe infections 10 mg/kg (max 400 mg) every 12 hours for 3 doses then 10 mg/kg (max 400 mg) once daily
Therapeutic serum levels Trough (pre dose)	More than 10 mg/L More than 20 mg/L for osteomyelitis, serious infections or immunocompromised
Administration	Intravenous bolus over 3 – 5 minutes or infusion over 30 minutes.
Monitoring	Blood levels on the 5th dose. **Important** • Blood samples must be taken via a venepuncture, not from any existing venous access.
Blood sampling times	Pre dose (trough) levels - immediately before dose. Prearrange with Microbiology before taking any blood samples as not assayed on site.

APPENDIX D Therapeutic Drug Monitoring - Tobramycin

Patient details required to advise /revise Tobramycin dose	• Clinical diagnosis • Weight • Serum creatinine • Tobramycin - dose, times of doses - serum levels and times
Prescribing Tobramycin Dose (symmetric dosing)	*Loading dose* 10 mg/kg (MAXIMUM DOSE 660 mg) once daily in 60mL Sodium chloride 0.9% Infused over 30 minutes
Therapeutic serum levels	Blood samples taken 12 hours after dose MUST be less than 2 mg/L **Levels outside the target range MUST be discussed with senior member of the CF team and or the pharmacist and or the microbiologist**
Administration	**Important** • Doses must be given at prescribed times otherwise interpretation is difficult. • Document on Drug Kardex the EXACT time the dose is given.
Monitoring Tobramycin levels	Monitor blood level 12 hours after first dose. If level is satisfactory and renal function is normal a further level should be done at the start of each week of treatment **Important** • **Peripheral venous blood samples are required (NOT from long line)** • Document the EXACT times the blood samples are taken on Drug Kardex and Laboratory Request Forms.
Monitor renal function	Check U&E before commencing tobramycin and weekly while on treatment

APPENDIX E Therapeutic Drug Monitoring - Vancomycin

Patient details required to advise /revise Tobramycin dose	• Clinical diagnosis • Weight • Serum creatinine • Tobramycin - dose, times of doses - serum levels and times
Prescribing Vancomycin Dose (Symmetric dosing)	*In normal renal function* Age 1 year - 16 years 15 mg/kg every 8 hours (Maximum daily dose 2 g) Age 17 years - 18 years 1 g 12 hourly Impaired renal function - contact Microbiologist
Therapeutic serum levels Pre dose (trough)	 10 - 15 mg/L
Administration	Reconstitute I g vial with 20 mL water for injection Dilute 1 g with fluid 250 mL Infusion fluid Max concentration 5 mg/ml Infusion fluid: sodium chloride 0.9% or glucose 5% Intravenous infusion rate 10 mg /minute over 60 minutes **Important** • Doses must be given at prescribed times otherwise interpretation is difficult. • Document on Drug Kardex the EXACT time the dose is given.
Monitoring blood levels	• Immediately before giving the 4th dose. • Repeat level twice a week if levels and the renal function stable. **Important** • Blood samples must be taken via a venepuncture, not from any existing venous access.
Sampling times	Pre dose (trough) levels - immediately before the dose.
Monitor renal function	Daily

APPENDIX F Post splenectomy prevention of infections Advice for Clinicians All clinical areas including Inpatients and Outpatients

Children that have had splenectomies, or who have conditions causing hyposplenism, are at risk of infections. The organisms are ususually encapsulated bacteria, of which Streptococus pneumoniae is the most common but includes Haemophilus influenzae and Niesseria meningitides. Other pathogens include Pseudomonas aeruginosa, and Capnocytophagia canimorsus from dog and animal bites. They are also at risk from other infections including protozoa (malaria and babesiosis).

The incidence of overwhelming post splenectomy infections is 0.18-0.432% per year. The mortality may be as high as 69%. There is lifelong risk of infection, but it is thought to be increased in the first two years post-splenectomy. The risk of infection is increased in children with Thalassaemia and sickle cell disease. Children with Hodgkin's disease, or immunosuppression through disease are also at greater risk.

PATIENT AND CARER EDUCATION

1. Information leaflet regarding infection risks and alert card
2. Medic alert bracelet
3. Regular antibiotics
4. Vaccination
5. Attend hospital if unwell
6. Seek advice before travelling abroad

SPLENECTOMY ALERT

1. Complete the child data alert inside the front cover of patient's notes.
2. Inform the patient's General Practitioner that the child has had a splenectomy and communicate vaccinations given in the hospital. Primary care records need to be marked concerning the patient's increased risk of infection and vaccination status.
3. Ensure that the child or the carer has been given a splenectomy leaflet and alert card (available from the Haematology Department on request).
4. Encourage the child and the carer to obtain a medic alert, disc, or carry an alert card.
5. There is a small risk of splenectomised individuals being exposed to infective biological materials in certain occupations. This needs to be considered as part of future career advice.
6. A child who has had a splenectomy, or who is hyposplenic, who becomes unwell and may have developed an infection, needs to be admitted to hospital for systemic antibiotics.

IMMUNISATION

Planned splenectomy
Immunisation should ideally be given four to six weeks (at least two weeks) prior to planned splenectomy as long as there is no history of allergy.

Emergency splenectomy
Immediately after an emergency splenectomy, child's ability to mount antibody response is low and therefore immunisation should be given when the patient is recovering, prior to discharge from hospital.

a) Pneumococcal polysaccharide vaccine (Pneumovax II) or pneumococcal polysaccharide conjugate vaccine (Prevenar 13). Revaccination is recommended every 5 years in individuals in whom antibody levels may decline more rapidly e.g.with sickle disease, and lymphoproliferative disease.

b) Haemhophilus influenzae type b vaccine conjugate and meningococcal C vaccine (combined Hib/ MenC).

- Children under 2 years

Vaccination according to the childhood immunisation schedule.

The booster dose of Haemophilus influenzae type b vaccine (combined with Meningococcal group C Conjugate vaccine) given at 12-13 months of age should be followed at least one month later by one dose of meningococcal A, C, W135 and Y conjugate vaccine.

An additional dose of Haemophilus influenzae type b vaccine (combined with Meningococcal group C Conjugate vaccine) should be given after the second birthday.

- Children over 2 years

One dose of Haemophilus influenzae type b vaccine (combined with Meningococcal group C conjugate vaccine), followed one month later by one dose of meningococcal A, C, W135 and Y conjugate vaccine.

Other vaccination considerations

a) Influenza vaccine should be offered annually.
b) Quadrivalent meningococcal ACWY vaccine should be offered if going to an endemic area on holiday. Protection from infection with this particular vaccine is short lived.
c) Ensure vaccination and re-vaccination status is documented in notes.
d) Patients that have had a splenectomy in the past should be offered vaccinations but consideration of lifelong antibiotic prophylaxis should be discussed with the patient.

ANTIBIOTICS

1. Children and their carers should be advised to continue antibiotics lifelong. Normally, penicillin or erythromycin if allergic to penicillin.

2. If there are concerns about adherence to antibiotic prophylaxis lifelong, it may be appropriate for them to have a course of antibiotics at home for 'at risk' situations. This could also be given to all children to be taken if they begin to feel unwell. Patients taking erythromycin should be advised to increase this to therapeutic doses if they begin to feel unwell.

   Importance of seeking prompt medical attention if unwell and develop signs of infection must be emphasized to the child and their carers. Persistent failure to adhere to advice about prophylaxis may require social concerns to be addresses.

3. Patients developing infection despite the above measures may need to be admitted as an emergency for intravenous antibiotics.

TRAVEL

1. Patients who have had a splenectomy, or have conditions causing hyposplenism, are at potential risk with overseas travel. Specialist advice may be obtained from infectious disease or tropical disease units.

3. Consider giving the patient a course of antibiotics to take with them on holiday. Patients visiting areas with meningitis should be offered the meningococcal ACWY conjugate vaccine.

4. The main protozoal infections that cause problems associated with splenectomy are malaria and babeisosis. Patients travelling to regions with malaria should be advised to assiduously follow standard recommendations regarding basic preventative measures, prophylaxis and diagnosis and treatment of suspected malaria. Asplenic patients with malaria may have delayed clearance of parasites from the blood stream despite appropriate treatment. If they feel unwell on returning fromholiday they should be advised to inform healthcare professional that they have been to a malarial area.

5. Babesiosis is a tic borne protozoal disease with similar clinical manifestations to malaria; the disease is rare and confined to a few regions around the world. Treatment for this includes a combination of clindamycin and quinine.

References

BNFC 2013-14. BMJ 2005; 331: 417-418. Clinical Medicine 2002; 2(5): 440-443. Journal of Travel Medicine 2003; 10(2): 117 Clinical Microbiology & Infection 2001; 7(12): 657. Immunization against Infectious Diseases http://www.dh.gov.uk/prod_consum_dh/groups/dh_digitalassets/documents/digitalasset/dh_131000.pdf

ROTHERHAM NHS FOUNDATION TRUST Telephone number 01709 820000		BARNSLEY HOSPITAL NHS FOUNDATION TRUST Telephone number 01226730000	
On call Consultant Paediatrician or Paediatric Registrar via switchboard		**On call Consultant Paediatrician or Paediatric Registrar** via switchboard	
Consultant Medical Microbiologist	7712	**Consultant Medical Microbiologist**	2749
Associate Specialist	4742	**Consultant Medical Microbiologist**	4986
Clinical Scientist	4741	**Biomedical Scientist**	3044
Paediatric Pharmacist	Bleep 8151	**Paediatric Pharmacist**	2047
Medicines Information Pharmacist	4126	**Medicines Information Pharmacist**	2857
Pharmacist Antimicrobial Lead	8132	**Pharmacist Antimicrobial Lead**	Bleep 688

Out of hours – contact appropriate on-call staff via switchboard

Authors

Professor Al-Wali	Consultant Microbiologist
Dr Asensio	Associate Specialist Microbiologist
Dr Gupta	Consultant Paediatrician
Dr Harrison	Consultant Paediatrician
Dr Pang	Consultant Microbiologist
Dr Rao	Consultant Microbiologist
S Ahuja	Medicines Evaluation Pharmacist
A-M Bester	Pharmacist Paediatrics
G Lawson	Pharmacist Antimicrobials
D Mowbray	Pharmacist Paediatrics
S Sutcliffe	Pharmacist Paediatrics

Acknowledgments

Sheffield Hospitals	Guidelines for cystic fibrosis
Leeds Hospitals	Guidelines for infective endocarditis

Issue date: May 2013
Review date: 2015

Types of Antimicrobials

ANTIBACTERIALS

Betalactams			
Penicillins Amoxicillin Benzylpenicillin Co-amoxiclav Flucloxacillin Penicillin V Piperacillin/tazobactam Temocillin	**Cephalosporins** Cefalexin Cefotaxime Ceftazadime Ceftriaxone Cefuroxime	**Carbapenems** Ertapenem Imipenem Meropenem	**Monobactam** Aztreonam
Macrolides	**Tetracyclines**	**Quinolones**	**Sulphonamides**
Azithromycin Clarithromycin Erythromycin	Doxycycline Minocycline Tigecycline	Ciprofloxacin Ofloxacin	Co-trimoxazole
Aminoglycosides	**Glycopeptides**	**Others**	
Amikacin Gentamicin Tobramycin	Teicoplanin Vancomycin	Chloramphenicol Colomycin Linezolid Metronidazole Nitrofurantoin	Rifampicin Sodium fusidate (Fusidic acid) Trimethoprim

ANTIFUNGALS

Amphotericin (Ambisome®) Caspofungin Fluconazole Voriconazole	Itraconazole Miconazole Nystatin Terbinafine		

ANTIVIRALS

Aciclovir Famciclovir Valaciclovir			

See BNF for further details and drugs not listed

Rotherham Hospital
Moorgate Road
Oakwood
Rotherham
S60 2UD

Telephone 01709 820000
www.therotherhamft.nhs.uk

Barnsley Hospital
Gawber Road
Barnsley
S75 2EP

Telephone 01226 730000
www.barnsleyhospital.nhs.uk

Produced by TRFT Graphic Design Service 01709 426352 / JS 12/13 WFO